

BOTANICAL ABSTRACTS

Monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense

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A monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense.

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THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.

BURTON E. LIVINGSTON, Editor-in-Chief
The Johns Hopkins University, Baltimore, Maryland

Vol. IV

JULY, 1920
ENTRIES 1-1853

No. 1

AGRONOMY

C. V. PIPER, *Editor*

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1. AMOS, ARTHUR. The difficulties of growing red clover. Clover sickness, and other causes of failure. Jour. Roy. Agric. Soc. England 79: 68-88. 5 fig. 1918.—Failure of red clover crops commonly known as "clover sickness" is held to be due to one of two diseases, either eelworm disease or stem rot disease of clover. These two common diseases are described and leguminous crops attacked by each given. The remedy advised is to avoid all susceptible crops for a period of years. The author states that the evidence in support of toxic substance being excreted by the previous clover crop and causing clover sickness, is scant.—J. J. Skinner.

2. ANONYMOUS. The food value of the potato crop. Jour. Bd. Agric. [London] Supplem. 18: 23-27. 1919.—Analyses of the composition of 247 samples of potatoes grown in the United Kingdom in 1917 gave the general averages of 22.09 per cent dry matter and 0.327 per cent nitrogen. These are appreciably lower than the Continental averages as quoted by König, viz., 25.0 per cent and 0.336 per cent respectively, and slightly higher than the average dry matter content (21.7 per cent) commonly given for American potatoes.—No significant difference in composition was indicated between the late or maincrop varieties and the early varieties. A consistent difference representing probably, in the main, the effects of difference of rainfall was found between the potatoes grown in the eastern and in the western halves of the country as arbitrarily divided by longitude 2°W, the averages being 22.72 per cent and 0.331 per cent, and 21.79 per cent and 0.337 per cent respectively.—M. B. McKay.

3. ANONYMOUS. Peat soils in Iowa. Jour. Amer. Peat Soc. 12: 201-202. 1919.—There are two classes of peat soils in Iowa, the shallow (not over 3 feet) and the deep. Drainage by tiling is recommended. Corn and small grain crops usually do not do well on newly reclaimed peat. For forage a mixture of timothy and alsike clover is best.—G. B. Rigg.

4. ANONYMOUS. Wart disease of potatoes order, 1918, and inspection of immune crops. Jour. Bd. Agric. [London] Supplem. 18: 114-115. 1919.—See Bot. Absts. 4, Entry 1222.

5. ANONYMOUS. Agricultural possibilities of the Sahara. Sci. Amer. Supplem. 87: 297. 1919.

6. ANONYMOUS. Killing weeds with live steam. *Sci. Amer.* 120: 599, 613-614. 1919.
7. ANONYMOUS. Desert plants as fodder. *Sci. Amer.* 121: 220. 1919.
8. ANONYMOUS. [Rev. of: DENHAM, H. J. *Gossypium in pre-Linnaean literature*.—Botanical Memoirs No. 2. 8°, 24 p. University Press: Oxford.] *Jour. Botany* 57: 325-326. 1919.
9. ANONYMOUS. Gramineas de pradera. [Meadow grasses.] *Informacion Agric.* [Madrid] 9: 289-290. 2 fig. 1919.—Uses and manner of cultivating "fleo de prados" (*Phleum pratense*) and *Poa pratensis*.—*John A. Stevenson.*
10. ANONYMOUS. El sorgo forrajero. [Sorghum for forage.] *Revista Agric.* [Mexico] 3: 369-373. 2 fig. 1919. [Reprinted from "Los Annales de la Sociedad Rural de Argentina." Aug., 1918.]—*John A. Stevenson.*
11. ANONYMOUS. The Uba cane in South Africa. *Tropical Life* 15: 154-155. 1919. [Excerpts of pamphlets issued by The Chilean Nitrate Propaganda and Hawaiian Sugar Planters' Assoc. Exp. Sta.]—Sugar cane is being successfully grown in Natal throughout the country extending from Port Shepstone on the South Coast to the Umfolosi River on the North Coast. The average mean temperature of this region is 77°F., the average annual rainfall about 40 inches. The Uba cane (*Saccharum officinale*) has been known to root to a depth of 12 feet. This deep-rooting habit enables the cane to withstand high winds and the recurring periods of drouth which are sometimes destructive to the shallow rooting varieties. Uba cane although introduced into Mauritius from Brazil in 1869 probably originated in India. Analysis of Uba cane shows a large percentage of fibre but a good quality of juice, the average and maximum being as follows in each case: Total solids in juice, 20.32 and 22.70 per cent; Sucrose, 18.61 and 20.79 per cent; Purity, 91.60 and 91.20 per cent.—*H. N. Vinall.*
12. ANONYMOUS. Los triboles. [Clovers.] *Informacion Agric.* [Madrid] 9: 271-272. 3 fig. 1919.—The uses, soils to which it is adapted, and rate of seeding, of white clover (trébol blanca), alsike clover (trébol hibrido), and red clover (trébol violeta).—*John A. Stevenson.*
13. ANONYMOUS. Textile fibers in Germany. *Sci. Amer. Supplem.* 87: 217. 1919.—Mention is made of the use of fibers from nettles and coniferous woods for textile manufacture.—*Chas. H. Otis.*
14. ANONYMOUS. Sorghum. A plant of value as a source of food and industrial raw material. *Sci. Amer. Supplem.* 88: 60-61. Fig. 1-9. 1919. [Translated from *La Rousse Mensuel.*]
15. ANONYMOUS. The high price of sugar. *Tropical Life* 15: 100. 1919.—A compilation giving discussions regarding the present shortage of sugar. The crop for the different sugar producing countries is listed for 1917-18 and for 1918-19 and a deficiency of nearly 800,000 tons is indicated. The totals (tons) were as follows 1917-18: cane sugar, 12,346,820; beet sugar, 4,866,789; total 17,213,609. 1918-19: cane sugar, 12,048,866; beet sugar, 4,390,092; total, 16,438,958.—*H. N. Vinall.*
16. ANONYMOUS. The world and its food supplies.—Part XII. *Tropical Life* 15: 115-116. 1919.—A compilation showing the remarkable expansion in the uses of the soy bean (*Soja max*), especially as a human food. Figures are given for the exports of soy beans and soy-bean products from Manchuria. In 1907 the annual exports did not exceed 120,000 tons, while in 1909 they had increased to 700,000 or 800,000 tons and the British consul at New-chang estimated the export of the bean in all its forms from that port in 1909 as 1,300,000 tons. The various uses of the soy bean in commerce are listed.—*H. N. Vinall.*

17. ANONYMOUS. New Zealand flax. Kew Bull. Misc. Inf. [London] 1919: 169-177. *Pl. 1-3*. 1919.—This is an account of the attempts to grow New Zealand flax [*Phormium tenax*] on a commercial scale in the British Isles, including a statement by Lord Ventry of the experiments conducted in Ireland in the culture of this plant.—*E. M. Wilcox*.
18. ANONYMOUS. Sugar beet juiceries proposition. Australian Sugar Jour. 11: 370-371. 1919.—A committee appointed by the Minister of Agriculture reported on the practicability of the establishment in districts remote from the Maffra Sugar Factory of juicery plants for the extraction of raw sugar from beets, which could then be sent to Maffra to be refined. It was reported technically possible for 75 to 85 per cent of the sugar to be extracted by crushing the beets and evaporating the water from the crude juice. This product could be transported long distances and would keep for periods extending to 3 years. It was found not to be profitable under the present conditions.—*C. Rumbold*.
19. ANONYMOUS. Soy bean milk. Sci. Amer. Supple. 87: 233. 1919.
20. ANONYMOUS. Salt and the growth of coastland plants. Agric. News [Barbados] 18: 321. 1919.—The author discusses the toleration of salt exhibited by tropical crops such as sugar-cane, cotton and coconuts, which are cultivated on coastlands in the West Indies.—*J. S. Dash*.
21. BANO, JOSE DE. El efecto del amacollamiento de los cereales respecto de su producto. [Effect of tillering of cereals on yield.] Revista Agric. [Mexico] 4: 218-219. 2 fig. 1919.—Heavy tillering of cereals in tropical regions with consequent irregularity in time of maturity results in lowered yields. This condition is especially marked in Mexico.—*John A. Stevenson*.
22. BARBER, C. A. Studies in Indian sugar canes, No. 4. Tillering or underground branching. Mem. Dept. Agric. India (Bot. Ser.) 10: 39-153. *Pl. 37*. 1919.—A description is given of the different varieties of sugar cane. The varieties vary greatly in the rate of maturing and the number of canes produced per plant. Tables are presented showing the relative rate of maturing. The branching of various groups, from the wild saccharums to the thick tropical canes is of similar nature but differs in degree. A discussion of morphological characteristics is given together with illustrations, showing the characteristics of the various varieties.—*J. J. Skinner*.
23. BARBER, C. A. Studies in Indian sugar canes, No. 5. Mem. Dept. Agric. India (Bot. Ser.) 10: 155-175. *Pl. 8*. 1919.—The paper deals with the results of testing the suitability of sugar cane varieties for different localities. There is a tendency of each variety to grow better near its native habitat.—A special study was made of the following varieties: *Saretha*, *Chin*, *Khari*, *Pansahi*, *Chynia*, *Baroukha*, and *Mungo*.—*J. J. Skinner*.
24. BARBER, C. A. The growth of the sugar-cane. II. Internat. Sugar Jour. 21: 545-548. *Fig. 1-4*. 1919.—Sugar cane is not propagated by seed because the flowering of the plant is uncertain, the seed so small as to be difficult to handle and the time between sowing seed and reaping varies in India from 16 to 18 months, while a "set" will produce its ripe canes in about 12 months. An even field cannot be expected from seed-grown canes, while plants produced by "sets" are exactly like their parents. The second period of growth consists of the elongation of the stems by the formation of much larger joints than those found underground. This period closes with the formation of flowers and seed. Buds and root-eyes are formed in each joint for which reason any joint of cane planted will produce a new plant. Branching and rooting of the aerial portion of the plant is repressed by light and by the lack of moisture. In many moist climates where the rain collects in the bases of the old leaves, shooting and rooting start and the practice is to strip off the dying leaves at stated intervals. When canes fall to the ground similar branching starts and various means are taken to prevent "lodging." In the Godavari district of the Madras Presidency where cane reaches a height of 25 feet and cyclones are frequent, an intricate system of binding the stalks in bunches around bamboo poles is used.—*C. Rumbold*.

25. BARBER, C. A. *The growth of sugar cane.* III. Internation. Sugar Jour. 21: 601-603, 2 pl., 4 fig. 1919.—Deals with the branching of the plant. [See also next preceding Entry, 24.]—*E. Koch.*

26. BEAUVERIE, J. *Revue d'agronomie.* [Review of agronomy.] Rev. Gen. Sci. Pures et Appliquées 30: 370-384, 411-418. 1919.—In this interesting essay, which is much more than a review of agronomy, the author first indicates that the faculties of science in the universities should be, to a greater extent than they now are, the sources of knowledge to be applied to the world's most pressing question, that of food. He touches upon agricultural meteorology, discusses the more recent papers on the bacteria fixing nitrogen in soil, protozoa and soil-fatigue and their treatment, nitrate and phosphate fertilizers. The physiologist will appreciate the discussion of recent work on the relations of magnesium and calcium to the normal development of plants, in the course of which it is suggested that a lack of available magnesium may be connected with the abnormal condition known as chlorosis, and that our conceptions of the rôle of calcium may be faulty because water cultures in glass may contain calcium in unsuitable form or amount. There is a brief consideration of the new Alsatian sources of potash for fertilizers, but no discussion of the rôle of potassium in plant metabolism. The author summarizes the slight and contradictory results of experiments with radioactive substance applied to laboratory or plat cultures, and passes to a consideration of recent studies of animal nutrition.—*G. J. Peirce.*

27. BEVERLEY, J. *Sunflower notes.* New Zealand Jour. Agric. 18: 356-357. 1919.—The author recommends the growing of sunflowers for oil as well as using the seed for poultry and cattle. The large early maturing single-head sunflower is preferred over those plants producing many heads because of the difficulty in harvesting the seed from the latter. He advises that the stems be chopped up and used as fertilizer on the land as they contain about 5 per cent potash.—*I. S. Cook.*

28. BIGGAR, H. HOWARD. *The old and the new in corn culture.* U. S. Dept. Agric. Yearbook 1918: 123-137. 4 pl., 10 fig. 1919.—The article gives quite a detailed description of corn culture among the Indians, naming ten of the kinds of corn developed and cultivated, describing the methods of seed testing, the hill method of planting, the location and preparation of the fields, and the tools used. The description of seed selection, storage, correlation of development with prairie plants, and food products; all indicate that the Indian had an almost uncanny knowledge of corn culture and its utilization. Corn culture has been a very important factor in the development of Indian civilization. The article closes by showing the very great importance of corn in the agricultural and industrial development of the United States. Corn had a vital influence in the war. Its multiplicity of uses, its high productiveness, its value, and its adaptability makes the importance of corn, directly and indirectly in world affairs, more and more manifest each decade.—*C. J. Shirk.*

29. BIRCKNER, VICTOR. *Simple method of measuring the acidity of cereal products: its application to sulphured and unsulphured oats.* Jour. Agric. Res. 18: 33-49. 1919.—The important feature of the new method is the use of ice water for the extraction of the material. By this method the amount of acid present in oat (*Avena*) kernels does not change markedly during the early stages of spoilage. The Schindler method is deficient in that alcohol may be present during the extraction and subsequent titration.—If oats are sulphured their acidity is increased; but by the ice water method they show no increased acidity upon prolonged standing in the ground state, due to destruction of acid-forming ferments by the sulphur fumes; by the Schindler method pronounced increases occur.—Ice water extracts of oats or maize filtered and kept 24 hours at 1° or 2° undergo no change in acidity if not neutralized; but if neutralized a new formation of acid takes place, notwithstanding the low temperature.—*D. Reddick.*

30. BLACKSHAW, G. N. *Fertilizers for maize and tobacco.* Season 1919-1920. Rhodesia Agric. Jour. 16: 452-459. 1919.

31. BLAIR, W. S. **Orchard cultivation.** Fruit Growers' Assoc. Nova Scotia Ann. Rept. 55: 18-27. 1919.
- 32 BOASE, W. N. **The strongest and most durable fiber. The cultivation, preparation, spinning, weaving and history of flax.** Sci. Amer. Supplem. 88: 6-7. 42-43. 1919. [From *Jour. Roy. Soc. Arts* (London)].
33. BOLLEY, H. L. **Official field crop inspection.** Science 50: 193-199. Aug., 1919.
- 34 BOVELL, JOHN R., AND J. P. D'ALBUQUERQUE. **Report on the sugar cane experiments for the season of 1917-1919.** Dept. Agric., Barbados, 1919.—Pages 4-19 deal with results of manurial experiments chiefly. The results of these, however, are said to be inconclusive owing to attacks on the cane of root grubs of *Diaprepes abbreviatus* Linn. and *Phytalus smithi* Arrow. In continuation of previous work with cane varieties, it was found (pp. 20-80) that B. H. 10 (12), Ba. 6032 and B. 6450 have given best results in the order named over a large number of experiments. Some newer seedlings such as B. S. F. 12 (27) and Ba. 11569 are also showing great promise.—*J. S. Dash.*
35. BRIOUX, C. H. **Les tourteaux et farines de graines de coton.** [The oil-cake and meal of cotton seed.] Ann. Sci. Agron. Francaise et Etrangere 35: 401-420. 1919.—The work of WITHERS, W. A. AND F. E. CARRUTH of the North Carolina Agric. Exp. Sta. on the toxic principle gossypol in cotton seed is reviewed at length and attention is called to its importance in connection with the animal industry of France.—*A. B. Beaumont.*
36. BRISCOE, CHARLES F., AND H. H. HARNED. **Bacteriological effects of green manure. Study No. 11.** Mississippi Agric. Exp. Sta. Bull. 185: 1-18. 8 fig. 1919.—The object of this investigation was to determine the effect of micro-organisms in the fermenting of green manures and particularly the advantage of a light dressing of stable manure as compared with that of a bacterial culture, in the utilization of green manures for plant food. In carrying out the experiments two series of 3-gallon jars were used, one for the bacteriological, and the other for the vegetative tests. Sandy silt loam soil poor in nutrient elements was used. The green manures added were alfalfa, oats, and cow peas. Each pot to which bacterial emulsion was applied received an addition of about 25 billion germs. In every case an increase in the amount of green manure turned under gave an increase in oat crop yield. A maximum of 50 tons of the green manure was applied. A light dressing of a stable manure or the addition of a bacterial culture with a green manure gave a marked increase in the crop when 4 tons of the green manure were added. When 8 tons were added the effect was practically neutral; when 16 tons were added a depressing effect was noted from the addition of the germs, contained either in the manure or the bacterial culture.—The nitrogen content of the oat crop produced varied directly with amount of crop produced.—The cumulative effect of a green manure was marked.—*H. B. Brown.*
37. BROWN, H. B. **Cotton experiments, 1918.** Mississippi Agric. Exp. Sta. Bull. 186: 1-31. 3 fig. 1919.—This report gives results of cotton variety tests in five different sections of the State in which the performance of standard varieties and new strains developed by the Experiment Station were tested on different soil types. Cotton wilt and other studies made at the College Station are also reported. All the varieties grown showed some wilt infection but the wilt resistant varieties were damaged but slightly. Single stalk culture experiments gave 28 per cent better yields for early thinning. Fruiting studies showed that some varieties produced about 100 per cent more blossoms than others, and that some varieties retained more than 50 per cent of their forms while others retained less than 30 per cent. Germination counts and counts of number of seed in a given volume showed that the stand secured varied inversely with the size of the seed planted.—*H. B. Brown.*
38. BURGESS, J. L. Part I. **The farmers' interest in good seed.** Bull. North Carolina Dept. Agric. 40: 5-8. 1919.—This is a popular article which indicates the value of mature seed in influencing yield and discusses the occurrence of noxious weed seeds among cereal and forage crop seeds.—*F. A. Wolf.*

39. BURKILL, I. H. *Dioscorea alata*, the greater yam, race no. 50. Gardens' Bull. Straits Settlements 2: 158. 1919.
40. BURKILL, I. H. *Dioscorea Kegeliana*, Griseb., the "Yam Poule" of the West Indies. Gardens' Bull. Straits Settlements, 2: 158. 1919.
41. BURKILL, I. H. Yields of the lesser yam [*Dioscorea esculenta* (Lour.) Burk.] and of some African yams. Gardens' Bull. Straits Settlements 2: 159-165. 1919.
42. BURKILL, I. H. A progress report on the cultivation of the greater yam, *Dioscorea alata*—in the Botanic Gardens, Singapore. Gardens' Bull. Straits Settlements 2: 129-135. 1919.
43. BURROUGHS, G. D. Sweet potato storage houses in North Carolina. Potato Mag. 24: 8-9. 2 fig. 1919.
44. CALVINO, MARIO. Una leguminosa gigantesca como yerba forrajera para Cuba. [A gigantic legume as a forage plant for Cuba.] Estac. Exp. Agron. [Cuba] Bol. 43: 7-24. 7 fig. 1919.—*Meibomia leiocarpa*, locally known as "mermelada de caballo," has been introduced from Brazil and grown successfully on all types of soils, particularly on those lacking in lime and phosphate, and in regions subject to drought. Yields were high and the plant, either green or dried as hay, was readily eaten by live stock. Preliminary tests indicated a possibility of a further use of the plant for the production of fiber.—John A. Stevenson.
45. CALVINO, MARIO. Informe del director. [Report of the director.] Informe An. Estac. Exp. Agron. [Cuba] 1917-1918: 1-439. 180 fig. 1919.—A report of trials with various plants under Cuban conditions including corn, rice (local varieties), Indian millet, sorghum varieties, and buckwheat. Of legumes cowpeas, velvet beans, *Phaseolus helvolicus* (a native bean), *Enterolobium cyclocarpum*, and *Phaseolus lunatus*, the latter being found unsuitable, were grown. Two Japanese varieties of soy bean (*Glycine hispida*) (*Soja max*) gave good results. Japanese cane, elephant grass (*Pennisetum purpureum*), molasses grass (*Melinis minutiflora*), Rhodes grass (*Chloris gayana*), *Paspalum dilatatum*, and the kudzu vine (*Pueraria thunbergiana*) all gave promise as forage crops under varying conditions. Alfalfa was not successful. A number of the common textile plants were grown experimentally. The sugar cane work of the station was continued along two lines, the production of seed lings and fertilizer tests. Tobacco selection studies were carried on as in the past. [See Bot. Absts. 3, Entry 2586; 4, Entry 970.]—John A. Stevenson.
46. CAPITAINE, L. Le sésame en Orient. [Sesame in the Orient.] Jour. Agric. Tropic. 19: 311-316. 1919.—In this paper, the first of a series on the subject, the author discusses in a rather popular manner the principal centers of production, seasonal adaptations of the crop in different regions, the preparation of the seed bed, and seeding.—J. D. Luckett.
47. CARLE, E. Premiers travaux sur la sélection des riz du Laboratoire d'étude des céréales à Saigon. [First work in selection of rice at the Saigon Laboratory for the study of cereals.] Bull. Agric. Inst. Sci. Saigon 1: 74-87. 1919.
48. CAUTHEN, E. F. Comparison of peanut meal, cotton seed meal, velvet bean meal, ammonium sulphate, and nitrate of soda, as fertilizers for corn and cotton. Alabama Agric. Exp. Sta. Bull. 208. 6 p. 1919.
49. CHEVALIER, A. Quelques légumineuses d'Extrême-Orient utiles à répandre. [Some legumes of Indo-China worthy of wider use.] Bull. Agric. Inst. Sci. Saigon 1: 87-92. 1919.
50. COCKAYNE, L. An economic investigation of the montane tussock-grassland of New Zealand. New Zealand Jour. Agric. 18: 321-331. Pl. 4. 1919.—A further study of the montane tussock-grassland as to the relative palatability for sheep of the various pasture-

plants was made by a grazing test of sheep. Two hundred and eighty-one sheep were turned on 25 acres for 9 days and they seemed to prefer cocksfoot (*Dactylis glomerata*) first of all but if meadow grass (*Poa pratensis*) is present the cocksfoot is not touched until the meadow grass is cropped close. The plants taken after cocksfoot, in their apparent order of palatability were holy grass (*Hierochloa redolens*); willow (*Salix fragilis*); catsear (*Hypochaeris radicata*); Yorkshire fog (*Holcus lanatus*); seed heads of blue-tussock (*Poa colensoi*) and fescue-tussock (*Festuca novae-zelandiae*); tufted danthonia (*Danthonia semiannularis* var.) blue-tussock; tall blue-tussock (*Poa intermedia*); sweetbrier (*Rosa rubiginosa*); fescue-tussock (*Festuca novae-zelandiae*); and poa-tussock (*Poa caespitosa*). The author states that these observations regarding the plants eaten where sheep are grazing freely are notes merely and no definite conclusions are to be drawn. A table showing the opinions of various botanists regarding the palatability of the indigenous grasses of the montane and subalpine pastures is appended. [See next following Entry, 51.]-I. S. Cook.

51. COCKAYNE, L. An economic investigation of the Montane tussock-grassland of New Zealand. New Zealand Jour. Agric. 19: 120-138. Fig. 1-4. 1919.—This is the third article by the author on the Tussock Grassland of New Zealand in which he discusses the depletion of the grassland in the driest parts of Central Otago. The average rainfall is from 10.89 inches to 14 inches and this condition along with an excess of rabbits has resulted in nearly barren areas over much of this region. The only kind of plant able to live under such conditions is scabweed (*Paoulia lutescens*) which is worthless as a forage plant. Owing to the unfavorable conditions for any desirable forage plant to survive, almost any plant would be welcomed which would prevent the land from becoming barren. [See next preceding Entry, 50.]-I. S. Cook.

52. COWAN, JAMES. Crop production in the northern sandhills. Nebraska Agric. Exp. Sta. Bull. 171. 8 p. 1919.—A brief résumé is given of some of the work of the Sub-Station which is located in the sand hills region of northwestern Nebraska. A number of conclusions applicable to the sand hills are drawn, though data are not presented. It is stated that native hay grown in the wet and dry valleys may be improved by early spring scattering of timothy and redbud seed in the meadow.—Native varieties of corn have not been surpassed in yield by any imported corn. The growing of wheat in the sand hills is confined to the hard lands. The Irish Cobbler is the most productive variety of potatoes. Mulching a subirrigated crop of potatoes with litter reduced the yield more than 20 per cent, while the mulching of potatoes on dry, light, upland soils increased the yield 27 per cent. Beans are regarded as an unreliable crop on light land and are not to be depended upon under such conditions of drouth as cause failure with such a crop as corn. On uplands, it is considered useless to plant more garden truck than can be well soaked twice a week by application of water when rain fails. Nearly every species of orchard tree advertised or recommended for hardiness and drouth resistance, has been tried out on the upland without success.—No species of deciduous trees has been found satisfactorily to survive the adverse conditions of the dry upland sandy soil. Poplars and cottonwoods thrive on subirrigated bottom land that is not too wet. Bull pines raised from seed collected in the vicinity of the sub-station have done better than any other species of tree. Even these gradually die off from year to year. Shallow rooting induced by shallow soil and surface moisture is regarded as one of the primary causes of fatality among the trees. All species of deciduous trees grown are attacked by borers.—T. A. Kiesselbach.

53. CREVOST, C., AND C. LEMARIÉ. Plantes et produits filamenteux et textiles de l'Indochine [Fiber and textile producing plants of Indochina.] Bull. Econ. Indochine 22: 365-401. 3 pl., 1 fig. Ibid. 553-591. 2 pl., 9 fig. 1919.—The first paper consists of a critical discussion of the four cultivated species of cotton (*Gossypium*) in Indo-China, with cultural and statistical data regarding them. The second paper contains the descriptions and detailed discussions of the economic products of *Endodendron anfractuosum* DC., *Bombax malabaricum* DC., *Cochlospermum gossypium* DC., *Wrightia annamensis* Eberh. & Dub., *Calotropis gigantea* R. Br., *C. procera* R. Br., *Typha*, and *Dicksonia Barometz* Link. These two papers are to be reprinted in volume 2 of the author's Catalogue of the products of Indo-China.—E. D. Merrill.

54. CUTTING, M. C. Peat soils of Minnesota and their cultivation. Jour. Amer. Peat. Soc. 12: 190-194. 1919.—The state has 7,000,000 acres (nearly one-seventh of its total area) of peat land. Important factors in crop production on peat soil are drainage, climate and fertilization. Any one of these factors may be the limiting one. Three experimental tracts in different parts of the state were cultivated in 1918 by the State Experiment Station. On the basis of the results on the one in the northwest portion of the state it is suggested that rye, oats, barley, and a mixture of timothy and alsike clover be tried by the farmers of that region on either burned or unburned peat. On unburned peat the use of 12 tons of stable manure per acre or 200 to 400 pounds of acid phosphate is recommended. On burned peat the use of the fertilizer is unnecessary.—*G. B. Rigg.*
55. DAHL, A. L. Growing hops in California. Sci. Amer. Supplem. 87: 312-313. 4 fig. 1919.
56. DASH, J. S. Quelques conseils aux producteurs de cannes de la Guadeloupe. [Hints to the sugar-cane growers of Guadeloupe.] Sta. Agron. Guadeloupe Bull. 1: 11-30. 1919.—See Bot. Absts. 3, Entry 2616.
57. DEEM, J. W. Marton Experimental Area. New Zealand Jour. Agric. 19: 17-19. 1919. A summary of variety tests on wheat, oats, barley, and miscellaneous crops, and notes as to the feeding value of varieties of rape, kale, turnip, and kohlrabi.—*N. J. Giddings.*
58. DE GRAAF, W. C. De cultuur van genees krachtige planten in Nederland. [Cultivation of medicinal plants in Holland.] Pharm. Weekblad 56: 1101-1112. 1919.—See Bot. Absts. 3, Entry 2795.
59. DRAKE, J. A., J. C. RUNDLES, AND RALPH D. JENNINGS. Alfalfa on corn-belt farms. U. S. Dept. Agric. Farmers Bull. 1021. 32 p., 16 fig. 1919.
60. DUGGAR, J. F., AND H. B. TISDALE. Velvet bean seeds: results of germination experiments. Alabama Agric. Exp. Sta. Press Bull. 98. 4 p. 1919.
61. DUNLAP, M. P. The seed growing industry in Denmark. Seed World 6³: 18-19. 1919.
62. FAIRCHILD, DAVID. The palate of civilized man and its influence on agriculture. Sci. Amer. Supplem. 87: 68-71. 8 fig. 1919.
63. FARMER, GEORGE. Annual Report of the Economic Plants Division for the year ending 31st March, 1917. Dept. Agric. British East Africa Ann. Rept. 1916-1917: 29-36. 1918.
64. FEILITZEN, H. VON. Cultural experiments on moor lands. Jour. Amer. Peat. Soc. 12: 216-217. 1919.—An increased yield of hay in a 5-year test was secured by mixing sand with the surface layer of an imperfectly decomposed peat soil. A surface covering of sand also gave good results with various crops on shallow bog soils. Phosphorus carriers were beneficial. Nitrogen carriers were not beneficial on account of the high nitrogen content of the soils.—*G. B. Rigg.*
65. FORTUN, GONZALEZ M. Informe de los departamentos de agricultura y botanica. [Report of the departments of agriculture and botany.] Informe Estac. Exp. Agron. [Cuba] 1917-1918: 441-448. 1919.—Report of work for the year.—*John A. Stevenson.*
66. FRON AND RIGOTARD. Contribution a l'étude de la flore fourragere spontanée au Maroc et particulièrement du *Lotus arenarius* (Brotero). [Native forage plants of Morocco, especially *Lotus arenarius*.] Compt. Rend. Acad. Agric. France 5: 704-709. 1919.—A discussion of the properties of *Lotus arenarius* as a fodder plant, its botanical characteristics, its distribution, and its possible value under cultivation.—*E. A. Bessey.*

67. FRUWIRTH, C. Landwirtschaftliche wichtige Hulsenfruchte. [Agriculturally important legume-seed crops.] Landw. Hefte 30 and 31: 1-76. Pl. 1, fig. 1-11. 1919.—The first part of this important treatise dealing with peas, vetches, field bean, lupines and lentil was published in No. 29 of the same journal in 1918. The second part considers soy bean, kidney bean, scarlet runner, chick pea, ervil, *Vicia monantha*, and grass pea (*Lathyrus sativus* L.), besides various legumes whose seeds are imported into central Europe, including Lima bean, adzuki bean, mung, urd, moth, jack bean, sword bean, cowpea, asparagus bean, catjang, bonavist, gram (*Dolichos biflorus* L.), velvet beans, and pigeon pea. Extensive agonomic and botanical data are given concerning each crop, and also information concerning the uses and manufactured products of each. The work brings up to date previous similar publications of the author.—C. V. Piper.

68. GAYLORD, F. C. Making the Indiana potato crop profitable. Trans. Indiana Hortic. Soc. 1918: 25-28. 1919.—Cultural methods and care of the potato crop are discussed with notes on varieties for Indiana planting.—F. P. Cullinan.

69. GERUM, J. Über den Starkegehalt von Haferflocken. [The starch content of oat flakes.] Zeitschr. Untersuch. Nahrungs-u. Genussmittel 37: 157-159. 1919.

70. GERUM, J. Über den Ausmahlungsgrad der Mehle. [Degree of grinding of flours.] Zeitschr. Untersuch. Nahrungs-u. Genussmittel 37: 145-157. 1919.—The starch content in the air dried material is taken as an index of the degree to which meal has been ground. Report on rye and wheat meals for the last four years.—H. G. Barbour.

71. GIROLA, CARLOS D. Maíces argentinos y aclimatados; Variedades de Maíz cultivadas en Argentina. [Maize varieties cultivated in Argentina.] 160 p., 35 pl. Buenos Aires, 1919.—Classification and descriptions of the principal varieties and five botanical species of the genus *Zea* as given by Bonafous. Thirty-seven named varieties cultivated in Argentina are described and illustrated with plates—many of them colored, showing ears and kernels natural size. They are classified under six subspecies of *Zea mays*. Two diseases, carbon del maiz, *Ustilago maydis*, and palvillo del maiz, *Puccinia maydis*, are described and illustrated.—L. H. Dewey.

72. GRABER, L. F. Grimm alfalfa and its origin. Seed World 51: 21. 1919.

73. HARTWELL, BURT L. The manurial value of a modification of orthoclase-bearing rock where only potassium was deficient. Jour. Amer. Soc. Agron. 2: 326-329. 1919.—See Bot. Absts. 4, Entry 1661.

74. HAYES, H. K., AND R. J. GARBER. Synthetic production of high-protein corn in relation to breeding. Jour. Amer. Soc. Agron. 2: 309-318. 1919.—See Bot. Absts. 4, Entry 599.

75. HERITAGE, J. P. Some industrial uses of the potato. Sci. Amer. 121: 388, 398. 1919.

76. HERNANDEZ, NEMESIO M. The effect of natural fertilizers on the production of tobacco. Philippine Agric. 7: 308-313. 1919.

77. HERTEL, H. Landbruget i 1918 [Agriculture in 1918.] Tidsskr. Landøkonomi (Kjöbenhavn) 1: 1-43. 1919.—The article contains a general review of agricultural conditions in Denmark during 1918, particularly as affected by the war. During this period the importation of raw material of all kinds was almost entirely stopped and exports were reduced to practically nothing, while the local distribution of products was seriously hampered. The percentage of profit on various agricultural products was fixed by law. The war prices of wool, butter, fertilizers, etc., are discussed. The exportation of green vegetables, hops, and many other agricultural products was forbidden. The various war-measures as related to agriculture are discussed, indicating that the farmers of Denmark were seriously affected by war conditions. The harvest for the year 1918 was below normal. The importation of clover

seed from Russia almost ceased. During 1917-18, Danish cattle suffered seriously from lack of food, due in large part to the exceedingly dry summers during both years, and the ceasing of importation of oil cakes and oil meal from the United States.—*Albert A. Hansen.*

78. HOLLAND, J. H. **Food and fodder plants.** Kew Bull. Misc. Inf. [London] 1919: 1-84. 1919. This is an account of the history, distribution, popular botanical features and economic products of the chief food and fodder plants of the world. Both scientific and common names of the plants are given.—*E. M. Wilcox.*

79. HOLMES, SMITH, E. **Flax cultivation.** South African Jour. Indust. 2: 1022-1033. 2 pl. 1919.

80. HOLMES SMITH, E. **Fibre plant investigations.** South African Jour. Indust. 2: 969-983. 1919.

81. HUNTER, BYRON. **Dry farming for better wheat yields.** The Columbia and Snake River basins. U. S. Dept. Agric. Farmers Bull. 1047. 14 fig. 1919.

82. IVERSON, KARSTEN. **Lokale Forsøg med Kunstgodning til Korn og Rodfrugt.** Vdforte paa Fyn i darene 1901-1915. [Local experiments with fertilizers for cereals and root crops. Performed in Fyn in the years 1901-1915.] Tidsskr. Landbrug. Planteavl 26: 193-297. 1919.—See Bot. Absts. 4, Entry 1664.

83. IVERSON, KARSTEN. **Dyrkningsforsøg med forskellige sorter af toradet byg, 1913-1916.** [Experiments with different varieties of two-rowed barley, 1913-1916.] Tidsskr. Landbrug. Planteavl 26: 1-37. 1919.—Previous experiments have demonstrated that the Archer variety of barley yielded the highest average quantity of grain. Archer barley produces abundant foliage, ripens late and there is practically no difference in yield and botanical distinctions between the various strains experimented with; namely Svalöf's Princess and the three Prentice varieties, Lyngby, Tystofte and Abed. All are similar to Irish Archer. The results of a series of experiments are described in which the Tystofte strain is compared with Abed Bender, Svalöf Golden and Svalöf Hannchen, which are early ripening with short, stiff straw. Experimental comparisons were also made with Tystofte No. 40, Abed, Rex and Abed No. 570, all new strains. In general, the results indicate that the difference between the latest and earliest strains depends mainly on the factor of upright growth or crop lodging. Abed Bender yielded best results in lodged crops, while Tystofte Prentice yielded best in upright crops. Seven sets of experiments were used, located in seven different situations under varying soil conditions and each consisting of eight plots. Data were collected for four years, 1913-1916.—*Albert A. Hansen.*

84. JENNINGS, A. C. **The economic aspect of irrigation.** Rhodesian Agric. Jour. 16: 429-432. 1919.

85. JOHNSON, T., AND C. BOYLE. **Observations on the industrial and nutritive value of the potato in Ireland.** Jour. Dept. Agric. Ireland 19: 416-429. Fig. 1-3. 1919.—Discusses variation in starch content as related to differences in variety, soil, fertilizer, rainfall and climate.—*Donald Folsom.*

86. JONES, C. BRYNER. **The breaking up of permanent grass in 1918.** Jour. Roy. Agric. Soc. England 79: 24-44. 1918.—See Bot. Absts. 4, Entry 1665.

87. KILLER, J. **Über die Umzüchtung reiner Linien von Winterweizen in Sommerweizen.** [Concerning the changing over of pure lines of winter wheat into spring wheat.] Jour. Landw. 67: 59-62. 1919.—Experiments at the Experiment Station at Colmar in Alsace with a large number of pure lines of winter wheats showed that those belonging to a certain type may serve equally well as spring or winter wheats; those of another type, if sown early in the spring, will form more or fewer heads; while those of a third type do not even form culms

when spring sown. Examples of varieties of the first type are cited. All changing over of winter wheat into spring wheat is not considered as due to the acquisition and inheritance of new characters, but rather as the expression of inherent possibilities already present in certain strains or varieties. The ability thus to change over may be increased and fixed by selection.—C. E. Leighty.

88. LANXON, W. R., ARTHUR J. OGAARD, AND U. J. DOWNEY. Report of the Hettinger Sub-station for the years 1913 to 1918 inclusive. North Dakota Agric. Exp. Sta. Bull. 130. 56 p. Fig. 1-5. 1919.—(Authors not jointly responsible.)—Crop yields are given for various crop rotations. Yields are presented of different varieties of cereals and of one variety under various methods of treatment. Notes and some yields are given for flax and for potatoes. Yields are given for certain forage crops, especially for smooth brome-grass (*Bromus inermis*) and the foxtail millets (*Chaetochloa italica*). Notes and yields are given for field corn (*Zea mays*). Weather data relative to crop production are presented.—L. R. Waldron.

89. LEIGHTY, CLYDE E. The place of rye in American agriculture. U. S. Dept. Agric. Yearbook 1918: 169-185. 1919.—Rye is receiving more attention now by farmers, agricultural colleges, and experiment stations. Statistics are given showing the increased production in the United States. Rye and wheat as foodstuffs are compared quite favorably to rye. The reasons given for increased rye production are: the present unusual food situation, hardier nature, adaptability to poor soil, distributes labor in farm management, immunity to Hessian fly, excellence as a cover crop, traps nitrates through the winter, excellence for green manure, value as a nurse crop, quality as a soiling and silage crop, and finally utility as pasture crop. The grain is a good basis for flour mixtures, but is not a very good animal feed. The straw has high value as packing material, but not much value as feed. Article closes with a plea for overcoming the prejudice against rye and increasing its production and use in the United States.—C. J. Shirk.

90. LEIGHTY, CLYDE E. Buckwheat. U. S. Dept. Agric. Farmers Bull. 1062. 24 p. 6 fig. 1919.

91. LITTLE, A. D. The paper making qualities of Hawaiian bagasse. Exp. Sta. Hawaiian Sugar Planters' Assoc. Agric. Chem. Ser. Bull. 46: 5-51. 1919.—A report is given of a technical investigation regarding the utilization of Hawaiian sugar cane bagasse for paper making under the following heads: Discussion of previous attempts to utilize, technique involved, commercial aspects, estimates of investment and production costs, tabulation of experimental data, and list of patents involved.—J. M. Westgate.

92. MACDONALD, A. C. Report of the Director of Agriculture. Dept. Agric. British East Africa Ann. Rept. 1916-1917: 1-20. 1918.

93. MACPHERSON, A. Potato variety test. New Zealand Jour. Agric. 19: 40. 1919. A brief report on yields from forty-nine varieties.—J. N. Giddings.

94. M[ARCARELLI], B. Il semenzaio nel trapianto del riso. [The seed-bed and the transplanting of rice.] Gior. Riscicoltura 9: 40-47. 1919.—A popular article. The author advocates the transplanting of young rice plants (*Oryza sativa*) grown in a seed-bed to the field and gives instructions as to the preparation, fertilizing, seeding and care of the seed-bed.—R. Kent Beattie and Francesco Ventresca.

95. MARCARELLI, B. Il riso "Giallo Precoce Ardizzone." [The rice "Giallo Precoce Ardizzone."] Gior. Riscicoltura 9: 20-23. 1 pl. 1919.—This new variety of rice (*Oryza sativa*) selected by Pietro Ardizzone from the variety *Chinese Originario* in 1915 is very early but possesses the good qualities of the later varieties. The plant is noticeably paler green in color than other common Italian varieties. It yields up to 50-55 quintals per hectare (75 to 82 bushels per acre). Its culture is spreading rapidly in Italy.—R. Kent Beattie and Francesco Ventresca.

96. MARCHAND, B. DE C., AND B. J. SMIT. The composition of some feeding stuffs. Union of South Africa, Dept. Agric. Bull., Gen. Ser. 5: 1-11. 1919.

97. MATHIEU, E. Acclimatisation trials of lima beans (*Phaseolus lunatus*). Gardens' Bull. Straits Settlements 2: 121-129. 1919.—As a result of trials with eight varieties of American lima beans through three generations, it was concluded that the beans had not suffered degeneration through change of climate and had become definitely acclimatized.—S. F. Trelease.

98. MCCALL, J. STEWART J. Nyasaland Protectorate. Ann. Rept. Dept. Agric. for year ending 31st March, 1918. 26 p. 1919.

99. MCCLELLAN, F. C. Zanzibar protectorate. Ann. Rept. Agric. Dept. for year 1917. 15 p. 1919.

100. MCHARGUE, J. S. The effect of manganese on the growth of wheat: a source of manganese for agricultural purposes. Jour. Indust. Eng. Chem. 11: 332-335. 1919.—See Bot. Absts. 4, Entry 1610.

101. MCKEE, ROLAND. Australian saltbush. U. S. Dept. Agric. Bull. 617. 11 p. Fig. 1-4. 1919.—This forage plant, *Atriplex semibaccata*, was introduced into this country about 25 years ago and distributed for planting throughout the arid and semi-arid regions. Successful production has occurred only in certain regions of southern California and in Arizona. The plant is semiwoody, perennial, procumbent and forms a dense mass. It is thriving best in regions having a minimum temperature of 19°F, mean annual rainfall of 9 to 16 inches and soils relatively high in alkali. The plant is comparatively drought resistant, spreads aggressively and is high in content of common salt. For the last reason it is not highly palatable but a valuable range feed for sheep, goats, cattle and horses when other feed is scarce. For maximum value, it should be supplemented with other forage. Its greatest value is to supply a late summer range forage and in some cases a soiling crop. It has little value as hay.—E. V. Hardenburg.

102. McLEAN, FORMAN T. The importance of climatology to tropical agriculture. Philippine Agric. 7: 191-194. 1919.—See Bot. Absts. 4, Entry 379.

103. McTAGGART, A. Limiting factors in farming. New Zealand Jour. Agric. 18: 332-338. 1919.—The subject is treated under subheads of labor, machinery and power; soil-moisture; weather conditions; knowledge and its application; business training; soil treatment; weeds; pests and diseases; coöperation; and migratory farming. The difficulties encountered and possible methods of overcoming them are dealt with briefly. This entire problem is one which should receive careful investigation from the best men in the various fields.—N. J. Giddings.

104. MERCIER, C. A. The electrification of seeds. Sci. Amer. 120: 142-143. 6 fig. 1919.—The process is very simple in principle. A salt solution that will act as a conductor is placed in a tank, the seeds to be treated are steeped in it, and a weak current of electricity passed through it by means of electrodes of large surface, attached to two opposite end walls of the tank. The seed is then taken out and dried. The kind of salt used, the strength of the solution, the length of treatment, the strength of the current and the speed and amount of drying is varied according to the kind of seed, soil factors and other conditions. Detailed methods have been worked out for wheat, oats and barley, but root crops, maize, rice, cabbage and other plants grown for seed are known to be benefited. Advantages of the process are (1) an average increase of yield of 25 to 30 per cent; (2) increased quality of crop as indicated by the weight per bushel, which in the cereals mean better milling quality, less offal and more flour per bushel; (3) an increase in the straw (electrified seed produces larger crops of straw and the straws are longer and stronger than unelectrified), and (4) the reduction in the growing plants of smut, bunt, rust and other fungus diseases. Disadvantages are (1)

unsatisfactory results if process is not properly carried out, (2) only temporary effect upon the seed (treated seeds will retain their enhanced efficacy only for about a month after electrification, if kept in a dry place) and (3) the advantages accruing from the process are not uniform.—*Chas. H. Otis.*

105. MIGAULT, L.-D. Quelques notes sur une mauvaise herbe. [Some notes on a bad weed.] *Naturalist Canadien* 45: 181-183. June, 1919.—A semi-popular description of the "Reveille-Matin" (*Euphorbia helioscopia*) in parts of the Province of Quebec.—*A. H. MacKay.*

106. MOALOOT, P. H. Cultivating Ambrette shrubs in Grenada, British West Indies. *Amer. Druggist and Pharm. Rec.* 67: 301-303. 4 fig. 1919.—An account of the cultivation of *Hibiscus Abelmoschus* of the *Malvaceae*. The seed has an odor like musk and is used in perfumery being marketed as Musk Seed, Ambrette Seed, or Grains d'Ambrette. The plant has upwards of 20 common names, one of them being Marshmallow, also a synonym of *Althaea*, U. S. P. The best crop is obtained when the seed is sown broadcast which may be any time from February to June, depending upon weather conditions. A botanical description is given and the methods used in cultivating, reaping, preparing the essential oil and marketing are given in detail.—*O. A. Farwell.*

107. MOGG, ALBERT OLIVER DEAN. Some preliminary observations on unseasonable veld-burning and its possible relation to some stock diseases. *South African Jour. Sci.* 15: 653. 1919.

108. MONDINO, ALFONSINO. Recherche anatomique e morphologiche sulla var. "tuberosa" Asch. dell "Arrhenatherum elatius" M. K. nuovamente trovata in Piemonte. [Anatomical and morphological studies on var. *tuberosa* Asch. of *Arrhenatherum elatius*. M. K. {(L.) Beauv., not M. & K.—C. V. P.} recently found in Piedmont.] *Atti R. Accad. Sci. Torino* 54: 782-794. 1919.—See *Bot. Absts.* 4, Entry 988.

109. MOSSÉRI VICTOR M. Note sur les dépôts nilotiques des Gazayer et Saouahel d'Égypte. [Note on the deposits of the Nile of the "Gazayer" and "Saouahel."] *Bull. Union des Agric. Egypt* 17: 49-78. 1919.—A scientific study of the alluvial deposits on the overflowed lands along the banks (Gazayer) and on the higher benches (Saouahel) of the river Nile confirms the correctness of the farming system of the fellahs (native farmers) which has been practised from remote antiquity. It is essentially a system of dry land farming with a single annual supply of water. The deposited soil is sometimes sand or a sandy clay but is more often a black clay. The author discusses the movements of the salts of calcium and other bases in this clay soil and the relation of these movements to the physical properties of the soil.—*R. Kent Beattie.*

110. MUNN, M. T. Seed tests made at the Station during 1918. *New York Agric. Exp. Sta. [Geneva] Bull.* 462: 135-156. 1919.—Purity tests were made of 179 official and 287 unofficial samples of agricultural seeds offered for sale in the state of New York; also, 396 samples were tested for viability. Comments are made on the results of the tests, the need of a stricter seed law, and the importance of testing the viability of cabbage seed. Warning is given against the purchase of the cheap, impure seed mixtures offered by mail order seed houses. Directions are given for the home testing of seed corn and the detection of injury to seed corn by freezing.—*F. C. Stewart.*

111. MURIAS, J. SUAREZ. Informe del departamento de semillas. [Report of the seed department.] *Informe An. Estac. Exp. Agron. [Cuba] 1917-1918:* 465-477. 1919.—Report of germination, purity, and other seed testing for the year.—*John A. Stevenson.*

112. MURRAY, H. E. The sugar industry of British Guiana. *Jour. Bd. Agric. British Guiana* 12: 83-89. 1919.—Gives brief history of industry from 1877 to date. Recommends up to date factories, mechanical tillage and an increased number of small cane farmers. Gives details for allotting land to cane farmers and methods which they should follow in working the land.—*J. B. Rorer.*

113. NEIDIG, RAY E., AND LULU E. VANCE. Sunflower silage. Jour. Agric-Res. 18: 325-327. 1919.—The composition of sunflower silage compares very closely with that of maize silage. Practical feeding tests indicate that sunflower silage is equal to maize silage for many purposes. Sunflower (*Helianthus*) may prove a good silage substitute for maize where the latter can not be grown.—D. Reddick.

114. NILSSON, GEORGE. Redogorelse för försök med havresorter på Domnarvet 1905-1917. [Account of oat variety tests at Domnarvet (Sweden) 1905-1917.] Sver. Utsädesf. Tidskr. 29: 37-44. 1919.—Fourteen years tests of 11 varieties of oats with records on yield of grain and straw, time of maturity, hektoliter weight, weight per thousand grams, per cent of kernel, and proportion of double kernels. Comparison with data from Ultuna indicates that the same varieties produce a better quality of grain in the more northern region. Recommends Victory and Goldrain for medium and Bjorn and Svalof's Dalahavre for early varieties.—E. G. Anderson.

115. OAKLEY, R. A. Critical studies in seed production. Seed World 61: 41-42. 1919.—Author states that there is great need of critical investigation to stabilize commercial seed production. Critical experimentation will clear up some vital seed production problems and certain fallacies relative to acclimatization and deterioration of planting stocks.—M. T. Munn.

116. PERALTA Y LEAÑO, FERNANDO DE. A study of the relation of climatic conditions to the vegetative growth and seed production of rice. Philippine Agric. 7: 159-179. Pl. 1-4. 1919.—Plots of lowland rice were started every four weeks during a period of one year, and observations on climatic conditions and on growth and seed production were made regularly throughout the period. The author reports that the yield of grain was highest in cultures that were sown in April, May, and June, respectively, and then decreased rapidly to the culture sown in October, after which it increased again. The maximum vegetative growth and grain yields were obtained during the period of highest evaporation rates (measured by Livingston atmometers), and the minimum were obtained during the season of low evaporation rates. A discussion is given of the relation of the development of the plants to temperature, evaporation, insolation, and rainfall.—S. F. Trelease.

117. PFEIFFER, TH., W. SIMMERMACHER, AND A. RIPPEL (in collaboration with Frl. H. FRISKE, AND Frl. CH. PFOTENHAUER). Der Gehalt der Haferpflanzen an Stickstoff. Phosphorsäure und kali unter verschiedenen Bedingungen und seine Beziehungen zu der durch eine Nährstoffzufuhr bedingten Ertragserhöhung. [The nitrogen, phosphoric acid and potassium content of the oat plant under different conditions and their relations to the increased yield resulting from addition of nutrients.] Jour. Landw. 67: 1-57. 6 fig., 15 tables. 1919.—See Bot. Absts. 4, Entry 1425.

118. ROBBINS, W. W. Research and seed testing. Seed World 510: 28. 1919.—The author discusses the question under two heads, namely; (1) organization of the individual laboratories for research work, and (2), organization and coördination of the research activities of North American seed laboratories. The conclusion reached is that investigation and research should constitute a definite part of the program of seed laboratories.—M. T. Munn.

119. ROIG, JUAN T., AND GONZALO M. FORTUN. Dos malvas textiles Cubanas. [Two Cuban malvas as fiber producers.] Estac. Exp. Agron. [Cuba] Bol. 41: 1-47. 8 fig. 1919.—A study was made of two very common indigenous species of the family *Malvaceae* of Cuba as to their possible value as fiber producing plants. *Urena lobata* and *U. sinuata* are described botanically, their distribution in Cuba recorded, and comparison made with other related Cuban plants which yield fiber. Manner of cultivation, results of fertilizer and cultural experiments, methods of harvesting and preparing the fiber, as well as obtained yields are given.—John A. Stevenson.

120. ROLET, ANTONIN. **Botanicals in central Europe.** Pharm. Era 52:283. 1919. (Translated from *Farmacica*).—The author discusses the cultivation of medicinal plants in Central Europe and their exportation to France and other countries before the war; he gives credit to CHARLES IRK, of the Bureau of Medicinal Plants of Kolozsyar Tschiret, as the initiator of the rational, systematic, cultivation of medicinal plants in central Europe.—*Oliver Atkins Farwell.*

121. RUPP, G. **Tabak-Ersatzmittel.** [Tobacco substitutes.] Zeitschr. Untersuch. Nahrungs-u. Genussmittel 37:370-377. 1919.—German tobacco substitutes include hops and beech, chickory, linden, maple, plane, and chestnut leaves; also clover and rose leaves, violet root powder, woodruff, plantain leaves, althaea, coltsfoot, baldrian root, nettle, curled mint, lemon rind, lavender and thyme; also pear, apple, walnut, hazelnut and artichoke leaves.—Preparations containing 20 per cent hops are said to produce headache and dizziness. Ethereal oils in tobacco substitutes considered harmless because burned. Content of pyridine, ammonia, CO, etc., in smoke of these products still undetermined.—Sample product: 30 per cent tobacco, 30 per cent cherry leaves, 30 per cent beech leaves, and 10 per cent woodruff, or 30 per cent tobacco ribs, 10 per cent cherry leaves, 30 per cent chestnut leaves, and 20 per cent beech leaves.—*H. G. Barbour.*

122. RUSSELL, G. A. **The effect of fertilizers on the composition of hops.** Jour. Indust. Eng. Chem. 11:218-224. 1919.—No constant definite effect of fertilizers on the amount of soft resins, hard resins, total resins, soluble ash, insoluble ash, and total ash present in the hops is found.—*H. Schmitz.*

123. SCARLETT, W. G. **Seed laws and seed testing from the viewpoint of the seedsmen.** Seed World 5³:242-243. 1919.

124. SCHRIBEAUX. **Sur l'herbe du Soudan.** [Sudan grass.] Compt. Rend. Acad. Agric. France 5:460-464. 1919.—Discussion of the culture of this grass (*Sorghum exiguum*) in southern France, with report of experiments made by M. LIBES as to the yield, etc. It is considered a very promising new forage crop for southern France.—*E. A. Bessey.*

125. SCOFIELD, C. S. **Cotton rootrot spots.** Jour. Agric. Res. 18:305-310. 7 fig. 1919.—See Bot. Absts. 4, Entry 1350.

126. SKERRETT, R. S. **For seed or for fiber? How a faulty system has led the American flax-grower to waste millions of dollars.** Sci. Amer. 121:30-31. 5 fig. 1919.—Discusses the need of conservation in our present flaxseed cultivation so that flax will be raised not only to supply seed for the manufacture of linseed oil and linseed cake, but also for the straw, linen yarns, short length fibers and cortex which can be woven into textiles and manufactured into numerous other products.—*Chas. H. Otis.*

127. SNELL, JOHN. **Potatoes: local immune variety trials.** Jour. Bd. Agric. [London] Suppl. 18:103-114. 1919.—See Bot. Absts. 4, Entry 1358.

128. STEVENS, O. A. **Weed seeds in analyses.** Seed World 5³:243. 1919.—A discussion is given of the variations which occur in the number of foreign seeds reported per unit weight of sample analyzed. Data are presented to show the range of variation which may be expected.—*M. T. Munn.*

129. STONE, A. L. **Testing of newly harvested field seed is difficult problem.** Seed World 5¹⁰:37. 1919.—Author considers the problem of the seed analyst to shorten the period required to obtain satisfactory germination tests of newly harvested seeds of grains and grasses. While a prolongation of the duration of the germination test gave a satisfactory test, the period between the time of thrashing and the time the grain is to be used for seeding or placed upon the market with germination data is so short as to make such a procedure a practical impossibility. From investigational work with wheat it appears that the maturation

tion process proceeds as rapidly in dry storage as in the presence of external or supplied moisture or vice versa. The problem becomes one of hastening the process of maturation, or determining from a large number of tests a satisfactory rate of increase, which may be used as a basis for computing germination tests of certain newly harvested seeds when time will not permit the securing of tests, in the usual way, upon fully matured seeds.—*M. T. Munn.*

130. STUART, WILLIAM. Production of late or main-crop potatoes. U. S. Dept. Agric. Farmers Bull. 1064. 39 p., 21 fig. 1919.

131. STUART, WILLIAM. Good seed potatoes and how to produce them. Potato Mag. 2³: 12-13; 2⁴: 14-15. 1 fig. 1919.

132. SWANSON, C. O., L. E. CALL, AND S. C. SALMON. Losses of organic matter in making brown and black alfalfa. Jour. Agric. Res. 13: 299-304. 1919.—The authors' summary is as follows: "Partially wilted alfalfa (*Medicago sativa*) stacked without curing undergoes fermentative changes which result in the loss of about two-fifths of the organic matter. This loss apparently increases with the length of time in the stack and with the degree of fermentative changes that occur. Alfalfa which has become black as a result of fermentation is very inferior as a feed for steers in comparison with both brown alfalfa hay and hay of good color and quality."—*D. Reddick.*

133. T[ARCHETTI], A. Puliamo i risoni e selezioniamo quelli da seme. [The cleaning of the rice-crop and the selection of seed-rice.] Gior. Riscicoltura 9: 2-7. 1919.—This popular description of the methods recommended is made especially necessary because of the excessive amount of yellow rice, immature rice, and dead grains in the 1918 crop of rice (*Oryza sativa*) in Italy.—*R. Kent Beattie and Francesco Ventresca.*

134. TAYLOR, H. W. Tobacco culture. Field operations. Rhodesia Agric. Jour. 16: 401-408. Pl. 1-3. 1919.

135. TUERO, FERNANDO LOPEZ. Anil. [Indigo.] Informacion Agric. [Madrid] 9: 169-170, 195-197, 224-228. 1919.—An account of indigo culture including botanical description of the species involved (*Indigofera* spp.), history of the culture, soils, seeding, cultivation, harvesting, and preparation of the final product.—*John A. Stevenson.*

136. TURNBULL, GERVAISE. Increased production of grass. Jour. Bd. Agric. Great Britain 26: 607-621. 1919.

137. ULIBARRI, RICARDO B. La papa. [The potato.] Bol. Camara Agric. Nacion. Leon Mexico] 6: 262-288. 1919.—A compiled account of the history, structure, varieties, cultivation, insect pests, and fungus diseases of the potato (*Solanum tuberosum*).—*John A. Stevenson.*

138. VARELA, E. El frijol dolico. [The Dolichos beans.] Revista Agric. [Mexico] 4: 18-20. 2 fig. 1919.—*Dolichos unguiculata*, *D. sesquipedalis*, and *D. lablab* described briefly.—*John A. Stevenson.*

139. WALDRON, RALPH AUGUSTUS. The peanut (*Arachis hypogaea*) its history, histology, physiology and utility. Contrib. Univ. Pennsylvania Bot. Lab. 4: 301-338. Pl. 79-80. 1919.—The author found root hairs on the plant, although reported absent by two previous workers. Their growth is stimulated by a high temperature and humidity, the tip hairs appearing in very young plants when growing rapidly and exposed to moist air. The hypocotyl, through the tendency to store sugar, enlarges and becomes tuberous unless growth conditions are ideal. The results of a study of stem structure and leaf structure follow in sequence. The author shows that the fruit stalks, or gynophores, are geotropic. The epidermal cells of the carpellary tips are remarkably granular thus suggesting a possible perceptive relation of the granules. The epidermis of the hypogeal parts becomes elongated to

form absorptive hairs. The development of the young fruit is described. Attempts to produce peanuts in the air yielded no definite results. Where the young fruits were allowed first to come in contact with the soil and were then exposed to the air, they continued to develop to a certain extent and turned green. A detailed bibliography is given. [See also Bot. Absts. 1, Entry 999].—*John W. Harshberger.*

140. WERNER, H. O. Seed potato production in Western Nebraska. *Potato Mag.* 2: 10-11. 4 fig. 1919.

141. WERNER, H. O. Potato experiments, 1917 and 1918. *North Dakota Agric. Exp. Sta. Bull.* 129. 22 p. Fig. 1-2. 1919.—Varieties Early Ohio, Irish Cobbler, Rural New Yorker, Green Mountain and Burbank were grown at 7 points in North Dakota for 1917-1918 and comparative yields secured. Yield data on 5 varieties were obtained at Fargo, North Dakota, with and without manure. Using mainly Early Ohio, yield data were obtained at Fargo when treatment dealt with position of buds on tuber, number of buds per piece of seed, method of cutting tubers, rapidity of sprout emergence and stalks per plant, date of harvesting, planting distance, treatment of seed tubers, spraying, hilling and cultivating. Weather data are given. No summary.—*L. R. Waldron.*

142. WERY, G. [Rev. of: AZZE. Les périodes critiques de la végétation et les phénomènes météorologiques. (Critical periods of vegetation in relation to meteorological phenomena.) Paper read before Acad. Agric.] *Compt. Rend. Acad. Agric. France* 5: 828-834. 1919.—This is a review of a paper presented by AZZE before the Académie Agricole. It discusses what is meant by the term 'critical period,' these periods being occasions that are harmful or entirely destructive to the crop under study because of some meteorological condition such as excess or lack of rainfall, too great heat, or frost, at times which may have a serious influence on the development of the crop. Thus a lack of rainfall at the time that wheat is beginning to head, though sufficient before or after that date, may seriously compromise the size of the crop. Description is given of the preparation of maps, which show for each individual crop, the critical periods for production in the different parts of the country.—*E. A. Bessey.*

143. WESTGATE, J. M., F. G. KRAUSS, C. A. SAHR, AND R. A. GOFF. [Report of work in agronomy.] *Hawaii Agric. Exp. Sta. Rept.* 1918: 11, 12, 26-35, 45-55. Pl. 6, 11. 1919.—Investigations have shown that a variety of corn introduced from Guam is very resistant to the attacks of the corn leaf hopper (*Percegrinus maidis*), much higher yields being obtained than from any of the strains introduced from the mainland. Plantings of edible canna (*Canna edulis*) yielded at the rate of over 40 tons of tubers per acre. The tubers constitute a valuable source of starch and also serve as pig feed in normal times and as an emergency human ration when necessary. Pigeon peas (*Cajanus indicus*) have given exceptional results as a drought-resistant leguminous crop, valuable both for seed and forage. A new strain of red kidney bean has been developed under the name New Era Copper Kidney, which has yielded 40 per cent more under field conditions than any other of the numerous varieties under test. The Hamakua Hybrid potato in the blight resistance tests outyielded any of the imported or other local varieties at the Glenwood substation.—*J. M. Westgate.*

144. WHEELER, W. A. Seed trade with European countries. *Seed World* 6¹: 32-36. 1919.

145. WHEELER, W. A. Some aspects of seed control. *Seed World* 6¹: 30-31. 1919.—A discussion is given of the objects of seed legislation, and the faults of the disclaimer clause. Uniform stock records should be kept of all lots of seed handled showing source, origin, description and quality of the stock.—*M. T. Munn.*

146. WHEELER, W. A., AND G. C. EDLER. Some effects of war upon the seed industry of the United States. *U. S. Dept. Agric. Yearbook* 1918: 195-215. 1919.—See Bot. Absts. 4, Entry 975.

147. WILLAMAN, J. J., R. M. WEST, D. O. SPRIESTERSBACH, AND G. E. HOLM. Notes on the composition of the sorghum plant. Jour. Agric. Res. 18: 1-33. 1919.—See Bot. Absts. 4, Entry 1482.

148. WRIGHT, C. HAROLD. The alluvial soils of Fiji. Dept. Agric. Fiji Bull. 11. 12 p. 1919.—See Bot. Absts. 4, Entry 1689.

149. ZOOK, L. L. Spring grains in western Nebraska. Nebraska Agric. Exp. Sta. Bull. 172. 16 p., 4 fig. 1919.—The experiments reported in this bulletin were conducted at the North Platte Experimental Sub-Station in central Nebraska, and cover a ten year period, 1909 to 1918 inclusive. Four spring crops—wheat, oats, barley and emmer were grown at four successive planting dates with 12 days intervals. Results are tabulated for each crop during each year and the following conclusions are drawn: Early seedings produced the best yields every year except two. The average yields of all crops were materially better from early than from late seedings. There was less difference between early and late seedings of barley and oats than of wheat and emmer.—Barley outyielded any other crop. On account of the length of season in which barley can be successfully seeded, its high feeding value and high yielding power, it should be more generally grown.—Lowest yields were obtained from emmer. There seems little justification for growing this crop in the western part of the State.—There was little difference between the values of spring wheat and early oats, either as a feed or cash crop.—Weed growth is usually less troublesome in early, than in late seedings.—T. A. Kiesselbach.

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

ALFRED GUNDERSEN, *Assistant Editor*

150. ANONYMOUS. [Rev. of: MACLEOD, JULIUS. The quantitative method in biology. Manchester University Press, and Longmans Green & Co. 1919.] Jour. Botany 57: 163-164. 1919.

151. ANONYMOUS. [Rev. of: THODAY, D. Botany: a textbook for senior students. 2 ed., 8 vo. *xix* + 524 p. Cambridge University Press, 1919.] Jour. Botany 57: 164-165. 1919.

152. ANONYMOUS. (Okefinokee Society.) Brooklyn Bot. Gard. Rec. 8: 146. Oct., 1919. News item, calling attention to the organization of the Okefinokee Society, with headquarters at Waycross, Georgia, for the purpose of securing all or part of the Okefinokee swamp as a permanent government reservation, to be used as a natural history museum, and a semi-tropical recreational and educational center.—C. S. Gager.

153. ANONYMOUS. La coloration et la chute des feuilles a l'automne. [The coloration and fall of leaves in autumn.] Naturaliste Canadien 46: 49-50 Sept., 1919.—A popular statement of the fact that the autumn change of color in leaves and their fall is due to the natural process of growth completed, and not due to physical injury by frost or wind.—A. H. MacKay.

154. ANONYMOUS. Teaching natural science in Norway. [Rev. of: KYERSKOG-AGERZBORG, H. P. The teaching of natural science in the primary and secondary schools of Norway. School and Society 9: 673-678. June 7, 1919.] Brooklyn Bot. Gard. Rec. 8: 147-148. Oct., 1919.

155. BIGELOW, MAURICE A. Children's gardening in the reconstruction period. Brooklyn Bot. Gard. Rec. 8: 133-138. Oct., 1919.—The primary purpose of children's gardens is not to produce useful plants, it is not to train professional gardeners, but it is to use the scientific methods of gardening as a very practical basis for important phases of cultural and useful education.—C. S. Gager.

156. BOULGER, G. S. [Rev. of: SAHNI, BIRBAL, AND M. WILLIS. Preface by J. C. WILLIS. *Lowson's text-book of botany* (Indian edition) revised and adapted by these authors, London. *xii + 610 p.* W. B. Clive.] *Jour. Botany* 57: 324-325. 1919.

157. DAVIS, BRADLEY M. *Introductory courses in botany.* *School Sci. Math.* 19: 797-800. Dec., 1919.—Outline No. 4, College half-year course; begins with vegetative parts of seed plants, physiology. Later plants in evolutionary sequence. No. 5. Year course in agricultural college. Mainly physiology and ecology, details of phylogeny not studied, economic plants used as far as possible. No. 6. Twelve week college courses. Cyanophyceae to Angiosperms. Morphology is emphasized, because facts can there be most clearly arranged.—A. Gundersen.

158. GAGER, C. STUART. A basis for reconstructing botanical education. *Science* 50: 263-269. Sept., 1919.—In deciding the content of an introductory course one should keep clearly in mind the purpose of education in general. The aim of education is not merely to give information, nor merely to teach somebody how to do something, nor to prepare young people to get a living, nor to get a living only by commercial pursuits. Public education should always adapt itself to the needs and ideals of the age. Mr. Rockefeller, Jr., has said "that every man is entitled to an opportunity to earn a living, to fair wages, to reasonable hours of work and proper working conditions, to a decent home, to opportunity to play, to learn, to worship and to love." Every subject in the curriculum therefore should, in its introductory course at least, have its content decided with reference to this entire modern ideal. The writer urges the desirability of offering, in all colleges, and universities, "cultural courses." We should never forget that one of the important aims of education is to enable the individual to find himself. The introductory courses should almost never be planned on the sole supposition that the student is to take more advanced courses. Public education should be planned, not solely with reference to utilitarian demands, but on a basis of broad culture as well.—A. H. Chivers.

159. GRIER, LT. N. M. The poppies of Flanders fields. *Nat. Study Rev.* 15: 342-343. Nov., 1919.

160. HERRMANN. [Rev. of: KRAEPLIN, K. *Naturstudien in Wald und Feld* (Nature study in wood and field) 4th edition, Leipzig and Berlin, 1918.] *Forest. Rundschau* 20: 15. 1919.

161. HERRMANN. [Rev. of: ROSEN, FELIX. *Anleitung zur Beobachtung der Pflanzenwelt* (Introduction to observations of the Plant World) 2nd edition, Leipzig, 1917.] *Forst. Rundschau* 20: 7-8. 1919.—Popular booklet on general botany.—F. S. Baker.

162. KOLBE, F. C. Some experiments used in the rudimentary teaching of botany. *South African Jour. Sci.* 15: 576-579. 1919.—The first stage of every science is pure observation. We put nature to the torture to make her reveal her secrets. That is experiment. When by these means we come to final principles we argue from them and the science passes into the deductive stage. "Experiments" in rudimentary teaching are not experiments at all. They are simply demonstrations—and usually book-work demonstrations—under distorted conditions.—E. P. Phillips.

163. NICHOLS, G. E. The general biology course and the teaching of elementary botany and zoology in American colleges and universities. *Science* 50: 509-517. Dec., 1919.—The general biology course originated with HUXLEY and was introduced into this country by MARTIN. In the average general biology course the laboratory material is selected more or less indiscriminately from both plant and animal kingdoms, but with animal material greatly predominant. The study of animals alternates with the study of plants. The aim of such a course is not so much to bring out the fundamental characteristics of plants as plants and of animals as animals, but rather to demonstrate that the two are merely different expressions of matter in the living state, and that the same underlying biological principles are applicable to both. For a number of years it has been the conviction of the writer that a course

in general biology of the type specified above ought not to be offered to elementary students, either as a cultural study or in preparation for advanced work in botany and zoology. The article contains a summary of opinions obtained by a questionnaire which was sent to 105 botanists and 65 zoologists, and by a series of letters loaned by Professor Margaret C. Ferguson, of Wellesley College. In effect the opinion of many botanists and zoologists is that theoretically a course in general biology, such as the one mentioned above, may seem desirable; practically it is not. The reasons are as follows: (1) Such a course is too dependent for its success on the personnel of its teaching staff; (2) It is a hybrid course; (3) It lays too much stress on abstract principles and too little on concrete facts; (4) It tends to give the student the impression that he has something he does not possess; (5) For students who plan to take further work in either botany or zoology it is especially disadvantageous; (6) In an institution having two distinct departments such a course should not be given by one of these departments; (7) The general biology course owed its perpetuation, as it did its inception, primarily to the zoologists. The nature of elementary courses in the biological sciences should be as follows: there should be two distinct courses,—elementary botany or plant biology, taught by a botanist, and elementary zoology or animal biology, taught by a zoologist; each of these courses should aim to achieve a two-fold end. It should serve as an introduction to more advanced courses, and it should also satisfy the requirements of the student for whom it will constitute the only biological course. It is felt by many botanists and zoologists that special courses in the biological sciences should be arranged for the benefit of students who wish to take but one course in this field.—A. H. Chivers.

164. SHAW, ELLEN EDDY. Sixth annual garden exhibit for Brooklyn boys and girls. Brooklyn Bot. Gard. Rec. 8: 138-142. Oct., 1919.

165. WEAVER, J. E. The quadrat method of teaching ecology. Plant World 21: 267-283. Fig. 1-7. 1918.—The value of the quadrat method of studying vegetation in the solution of economic and scientific field problems is discussed, and its usefulness in teaching ecology pointed out. Illustrative quadrat studies are presented, dealing with the vegetation of salt flats, prairies and ruderal associations.—Chas. A. Shull.

CYTOLOGY

GILBERT M. SMITH, *Editor*

GEO. S. BRYAN, *Assistant Editor*

166. CARTER, NELLIE. Studies on the chloroplastids of Desmids. I. Ann. Botany 33: 213-254. Pl. 14-18. 1919. II. *Ibid.* 33: 295-304. Pl. 19-20. 1919.—This investigation, based in part upon the extensive collections of G. S. West, is an attempt at the systematic study of the chloroplast structure in the different genera of the Desmids. The author finds that in the lower members of the family, the Saccodermæ, the chloroplast is simple in structure whereas in the higher members of the Placodermæ the chloroplast is frequently a complicated structure. In the species with complex chloroplasts the structure is usually constant for any species.—The number and position of the pyrenoids is determined by the size and shape of the chloroplast. When the chloroplast is of any size there are many pyrenoids. The number of pyrenoids is not constant in any semicell but the areas of pyrenoid formation are quite definite. Variation in pyrenoid number is dependent upon the varying physiological condition of the cell.—The nature of the chloroplast of several species in *Netrium*, *Closterium*, *Tetmemorus*, *Euastrium*, *Xanthidium*, and *Micrasterias* is discussed in detail.

167. CHAMBERLAIN, C. J. Cytology of the basidium. [Rev. of: FITZPATRICK, H. M. The cytology of *Eoconartium muscicola*. Amer. Jour. Bot. 5: 397-419. 3 pl. 1918. (See Bot. Absts. 1, Entry 1322:)] Bot. Gaz. 67: 376. 1919.

168. CHAMBERLAIN, C. J. Chromosomes in *Carex*. [Rev. of: HEILBORN, OTTO. *Zur Embryologie und Zytologie einiger Carex-Arten*. Embryology and cytology of several species of *Carex*. Svensk Bot. Tidskr. 12: 212-220. 15 fig. 1918. (See Bot. Absts. 1, Entry 1329; 3, Entry 38.)] Bot. Gaz. 67: 448. 1919.

169. CHAMBERLAIN, C. J. Chondriosomes in plants. [Rev. of: MOTTIER, D. M. Chondriosomes and the primordia of chloroplasts and leucoplasts. Ann. Botany 32: 191-214. 1 pl. 1918. See Bot. Absts. 2, Entry 81.] Bot. Gaz. 67: 270-271. 1919.—The reviewer discusses the names that have been applied to chondriosomes and similar structures, preference being given to mitochondria and chondriosomes as most likely to survive; chondriosomes seems the best term, because most noncommittal. The author's claim that chondriosomes are concerned in the transmission of hereditary characters is thought not to be well supported.—H. C. Cowles.

170. CLELAND, RALPH E. The cytology and life-history of *Nemalion multifidum*, Ag. Ann. Botany 33: 323-351. Pl. 22-24, 3 fig. 1919.—See Bot. Absts. 4, Entry 1016.

171. COULTER, J. M. Embryo sac and fertilization in *Oenothera*. [Rev. of: ISHIKAWA, M. Studies on the embryo sac and fertilization in *Oenothera*. Ann. Botany 32: 279-317. 7 pl., 14 fig. 1918. (See Bot. Absts. 1, Entries 482, 979, 980.)] Bot. Gaz. 67: 275-276. 1919.

172. ENSIGN, M. R. Venation and senescence of polembryonic citrus plants. Amer. Jour. Bot. 6: 311-329. 6 fig. 1919.—See Bot. Absts. 4, Entry 1555.

173. HITCHCOCK, R. Preliminary note on the differential staining of the cytoplasm of Characeae. Bull. Torrey Bot. Club 46: 375-379. 1919.—See Bot. Absts. 4, Entry 1022.

174. LEVINE, MICHAEL. Sexuality in the Basidiomycetes. [Rev. of: BENSAUDE, MATTHILDAE. Recherches sur le cycle evolutif et la sexualité chez les Basidiomycetes. P. 1-16. Pl. 1-13, fig. 1-30. Nemours, 1918.] Mycologia 11: 280-283. 1919.—See Bot. Absts. 4, Entry 1121.

175. MOLISCH, HANS. Beiträge zur Mikrochemie der Pflanze. [Contribution to the microchemistry of plants.] Ber. Deutsch. Bot. Ges. 36: 474-481. 1919.—See Bot. Absts. 4, Entry 1000.

176. PÉCHOUTRE, F. Revue de botanique. [Review of Botany.] Rev. Gen. Sci. Pures et Appliquées 30: 242-250, 1919.—A general review of papers in "the four languages" on the cell, morphology and anatomy, carbon assimilation, parasitism, symbiosis, reproduction and parthenogenesis, and the thallophytes. Under this last heading are treated sexuality in the Basidiomycetes, a parasitic Laminaria, and alternation of generations in the brown algæ.—G. J. Peirce.

177. PUJILUA, JAIME. Algunas observaciones citológicas, sobre todo en *Hedera Helix* y *Solanum tuberosum*, y la primera variante del método tano-argéntico, introducida por el Sr. del Río-Hortega. [Certain cytological observations, chiefly on *Hedera Helix* and *Solanum tuberosum*, and the first variation, introduced by Sr. Río-Hortega, of the argentic tannate method.] Broteria: Ser. Bot. 17: 67-96. 2 pl., 17 fig. 1919.—This study was undertaken to verify certain statements concerning plastids, and to estimate the reliability of a method of staining. Most of the work was done upon *Hedera Helix* and *Solanum tuberosum*, although *Agave* sp., *Pittosporum undulatum*, *Cornus mas*, and the roundworm (*Ascaris megalocephala*) were also investigated. Results were checked in all cases by comparing preparations with living material. The cell structure is much broken up by the shock of sectioning, and care must constantly be used to avoid misinterpretation. The "método tano-argéntico" passes paraffine sections through warm aqueous solutions of tannin, weak ammonia, ammoniacal silver, distilled water, gold chloride, and sodium hypochlorite. Protoplasmic granules, plastids, and starch grains color clearly. Karyokinetic figures show with especial distinctness, the intense blackish coloration permitting excellent photographic record. Resting nuclei

give less satisfactory results, the color concentrating in patches. Cells containing much albumen become wholly opaque. Starch grains color pinkish, cell membranes are usually colorless. Alcoholic material appears to give better results for starch coloration. In general, the method of staining, while presenting much value for study of certain structures, starch grains, etc., possesses little power of differentiation for many structures and must be used with caution.—The starch grains of *Hedera Helix* appear to be a new form of this substance; they stain brownish yellow with iodine and do not show concentric layers. The author discusses at length the protoplasmic granules stained by this method and concludes that they may perhaps be mitochondria, without postulating anything about their identity with animal structures; the term microsome could also be used. He thinks it more probable that these granules are similar in nature to leucoplasts, i.e., miniature leucoplasts; since both divide by constriction, and both produce starch. This conclusion is based upon a series of transition stages between granules and starch grains. Dangeard's ideas about vacuoles seem unworthy of recognition.—A bibliography of forty-two titles is given.—*Edward B. Chamberlain.*

ECOLOGY AND PLANT GEOGRAPHY

HENRY C. COWLES, *Editor*

GEO. D. FULLER, *Assistant Editor*

GENERAL, FACTORS, MEASUREMENTS

178. BATES, C. G. A new evaporimeter for use in forest studies. *Monthly Weather Rev.* 47: 283-294. *Fig. 1-3.* 1919.—The author discusses the factors which influence evaporation or transpiration from plants and the conditions which must be met before water losses from plants can be determined through instrumental methods. The "evaporation stress" or tendency to evaporate is produced by a different combination of factors in each body in which evaporation may occur in leaves. The vaporizing process takes place on the surface of the moist cell walls not directly exposed to moving air, so that the effect of wind is greatly minimized in leaf evaporation, the rate of diffusion being controlled by vapor pressures in the inter-cellular spaces. Evaporation from leaves is more directly controlled by radiant energy than from a body which does not absorb so readily, and may obtain considerable heat from air. Efforts were made to devise an instrument having the same relation to wind and radiant energy as do leaves of plants, with the idea of an "inner cell" for the vaporizing process, rather than a full exposed moist surface. A practical metallic instrument was devised, in which the essential feature is a moist layer of linen between two metal plates; the upper plate protects the wick from rain, being coated with lamp black and transmitting absorbed heat to the wick; the lower plate is thick and contains a number of small perforations simulating the stomata of leaves. Vapor formed in the moist linen escapes through these perforations. The linen is kept moist by a stem wick from a distilled water supply, and evaporation losses are obtained by weighings. Evaporation from this instrument follows the transpiration from small coniferous trees used in the experiment much more closely than do other types of evaporimeters. The objectionable feature of this instrument lies in its exposing a horizontal surface to evaporation. This may be an advantage if plant activity becomes less as the season advances, the instrument at the same time exposing its absorbing surface less squarely to the sun's rays.—*E. N. Munns.*

179. BLAIR, THOMAS ARTHUR. Influence of snow cover on the temperature distribution in Utah, January, 1919. *Monthly Weather Rev.* 47: 165-166. 1919.—Portions of Utah normally covered with snow were bare in the early winter of 1919 and other portions usually bare were covered with snow. Temperature records show that with snow negative departures of both mean maximums and mean minimums were from 4° to 22°, while without snow the departures were positive and ranged from 2° to 13°.—*E. N. Munns.*

180. BROWN, W. H. *Vegetation of Philippine mountains. The relation between the environment and physical types at different altitudes.* Philippine Bureau Sci. Publ. 13: 1-434. *Pl. 1-41, fig. 1-30.* 1919.—The author holds that the different types of vegetation found on tropical mountains are the result of the environment and correlates the physical types at different elevations with measurements of the environmental factors. The greater part of the publication is taken up with Mount Maquiling. Between elevations of 100 to 600 meters on this mountain is found a tall, three-story dipterocarp forest, a type of Schimper's tropical rain forest. Here the epiphytes are largely phanerogams and are confined chiefly to the largest branches of the tallest trees. The ground covering consists mainly of tree seedlings. At greater elevations the height of the trees decreases, the number of stories becomes less, epiphytes more abundant, and the ground covering more mesophytic; at the top there is a mossy forest composed of a single story of dwarfed, peculiarly shaped trees which are thickly covered with mosses and moss-like plants, and there is a ground covering of mesophytic herbs. The measurements of the environmental factors are very detailed and cover a continuous period of two years. The temperature and humidity were measured near the ground in six stations. Temperature was also measured in various situations in trees, by means of maximum and minimum thermometers. Evaporation was measured by Livingston atmometers near the ground, in the top of the canopy of the forests at different elevations, and in the various tree stories. Light was measured in five stations by means of radio-atmometers.—Temperature and light intensity decrease with rising elevations and the rates of growth and the heights of the trees at different elevations show a general agreement with the light-temperature indices—that is, with the product of light intensity multiplied by temperature indices for growth. Evaporation decreases with the increasing altitude, while the heights of the trees and rates of growth also decrease. Near the base of the mountain, however, it would appear that evaporation is high enough to be detrimental to the vegetation. Rainfall is greatest at middle elevations so that it would seem that the development of epiphytes is dependent on lower rates of evaporation and greater cloudiness rather than on high rainfall. The moisture content of the soil increases with rising elevations and it is only at the base of the mountain that it ever becomes low enough to be harmful to the vegetation. The increased moisture content of the soil and the lower rate of evaporation account for a greater degree of mesophytism in the ground covering at high than at low altitudes.—An account of the vegetation and measurements of environmental factors on Mount Banahao are also included. Here the dwarfing is more gradual than on Mount Maquiling and temperature indices for growth would appear to be sufficient to account for the dwarfing.—From these results it would seem that when dwarfing is gradual, on moist tropical mountains, it may be accounted for by decreases in temperature but that when it is rapid it is due to a combination of low temperature and low light intensity.—Near and at the top of Mount Banahao the rainfall is heavier than anywhere on Maquiling but cryptogamic epiphytes are not as well developed anywhere on Mount Banahao as at the top of Maquiling. This is due to the fact that on Mount Banahao the humidity is lower and clouds less frequent than on Mount Maquiling, and emphasizes the fact that epiphytes may not be proportional to rainfall.—The writings of many botanists would lead one to believe that they consider tropical vegetation as peculiar, and temperate vegetation as more normal. The writer brings forward a number of reasons for holding that the reverse is true; that is, that tropical vegetation is a generalized type and temperate zone vegetation a specialized one suited to the alternation of summer and winter seasons.—*E. D. Merrill.*

181. BURNS, GEORGE P. *Weather conditions and plant development.* Mem. Brooklyn Bot. Gard. 1: 119-122. June, 1918.—The author maintains that the effect of weather conditions presents a problem essentially physiological, and therefore one which is to be investigated by accurate experiments under controlled conditions. Mention is made of several methods employed in the past in attacking these problems, and it is shown that conclusions based on general averages are apt to be useless, because such averages conceal the essential facts. The author emphasizes strongly the importance of studying the conditions that obtain during critical periods.—*P. D. Strausbaugh.*

182. CHURCH, A. H. The plankton-phase and plankton-rate. Jour. Botany 57: Suppl. III. 1-8. 1919.—The term plankton was proposed by Victor Hensen in 1887 for the floating population of the sea, and has become a fundamental conception of the greatest biological interest. The author deplores the extension of the term to limits not originally intended. The subject is degraded by its application to "Limnoplankton" of a pond, "Saprop plankton" of dirty water or such curious expressions as the Cryptoplankton of algae found in snow. Plankton is more physiological than morphological, and relates to the problem of the food supply of the sea. Free unicellular forms of plant life are about all that is left under the term. The amount of such organic life is very great. Gran recorded 5-6 million per liter in milky water of Christiania Fjord. Generally, maximum plankton content occurs where coastal waters bring down land-debris. The deep blue of the ocean indicates a poor flora and fauna. In a liter of Kiel Bay water Lohman found a total of over $2\frac{1}{2}$ millions of organisms.—The plankton represents the oldest life on the planet, occurring as it did in the sea before benthic life began. Higher organisms still retain a plankton phase in their life history, which is a kind of recapitulation of their race history. To such a phase belong ovae, spermatozooids, gametes of all kinds, and spores. In the Siphonogamia and a few fungi alone is the plankton stage practically eliminated.—We may visualize the plankton rate as expressed by the amount of cytoplasm in one million zooids per liter. With such a unit, quantities of plankton often dissimilate in nature may be compared. A fair plankton rate may about equal the ionization of water; but there is no causal relation, since the mass of water can replace the ions, while the plankton is limited by scarcity of nitrogen and phosphorus. In the Sargasso Sea, the sea-weed uses most of the available N. and P. ions, and plankton life is thus very much reduced. However, the factors determining the amount of plankton a sea can carry are yet obscure. While of no exact scientific value at present, such considerations as the "mean plankton-rate" may be useful in establishing some general basis for the consideration of the phyto-plankton and phytobenthos of the British coasts. A bibliography is appended.—K. M. Wiegand.

183. DUFOUR, LEON. Les stations du *Physomitra esculenta* dans la forêt de Fontainebleau [France]. [Stations of *Physomitra esculenta* in the forest of Fontainebleau.] Bull. Trimest. Soc. Mycol. France 35: 142-143. 1919.—The author comes to the conclusion that two principal conditions seem to be necessary for this fungus. (1) a stand of pine-trees; and (2) a large amount of air and light.—Fred C. Werkenthin.

184. FULLER, GEORGE D. Maps of rainfall and crop plants. [Rev. of: (1) KINCER, JOSEPH B. Atlas of American agriculture. Advance sheet 1: Precipitation. U. S. Dept. Agric. Weather Bureau 1917; and (2) FINCH, V. C., AND O. E. BAKER. Geography of the world's agriculture. 10×13.5 inches. 149 p. 207 fig. 1917.] Bot. Gaz. 67: 102-103. Jan., 1919.

185. GINZBERGER A. Beiträge zur Naturgeschichte de Scoglii und Kleineren Inseln Süddalmatiens. [Natural history of the "Scoglii" and smaller islands of southern Dalmatia.] Denkschr. K. Akad. Wiss. Wien (Math.-Nat. Kl.) 92: 261-405. Pl. 1-8. 1916.—This contains a chapter on fungi by K. v. KEISSLER, one on lichens by A. ZAHLBRUCKNER [see Bot. Absts. 4, Entry 2557], one on mosses by JULIUS BAUMGARTNER, one on liverworts by V. SCHIFFNER [see Bot. Absts. 3, Entry 1589], and one on higher forms by A. BÜRGERSTEIN.—H. M. Fitzpatrick.

186. GLEASON, H. A. What is ecology? Torreyia 19: 89-91. 1919.—Ecology is defined as the accumulation and organization of knowledge concerning the correlation between the plant and its normal environment. It is often confused with morphology and physiology. These deal only with the structure and behavior of the plant, while ecology should consider these solely in correlation with the environment.—J. C. Nelson.

187. HARPER, ROLAND M. A new method of mapping complex geographical features, illustrated by some maps of Georgia. School. Sci. Math. 18: 699-708. 4 fig. Nov., 1918.—Author describes "a quantitative regional method" of mapping features such as soils, vege-

tation, crops, etc. Four maps of Georgia are given showing geographical divisions, soil types, tree distribution and leading crops, as an illustration of how this method of mapping is to be applied.—*P. D. Strausbaugh.*

188. HARTZELL, F. Z. Comparison of methods for computing daily mean temperatures: effect of discrepancies upon investigations of climatologists and biologists. New York Agric. Exp. Sta. [Geneva] Tech. Bull. 68: 1-35. *Pl. 1-2. fig. 1-19.* 1919.—Using the data from a complete thermograph record of the temperature at Fredonia, N. Y., for the year 1916, the author has calculated mean daily, mean monthly, and mean annual temperature by different methods and made a statistical study of the results. Means based on maximum and minimum temperatures were found to differ more or less from means obtained by dividing the sum of the hourly temperatures for each day by twenty-four (thermograph averages). This difference varied considerably with the hour at which the reading of maximum and minimum temperatures was made, being greatest for 5 p.m. readings, less for 8 p.m. readings, and least for midnight readings. Assuming the thermograph average to be the true mean, the error of daily means calculated by the other method may be so large as to make them practically worthless for use in biological investigations requiring close comparison of temperature data from day to day. Even monthly means so calculated may be so inaccurate as to introduce important errors into ecological work; but the error of the annual mean is negligible. The study also brought out clearly the fact that temperature averages admit of comparison only when calculated from readings taken at the same hour.—*F. C. Stewart.*

189. HESSELMAN, HENRIK. Om vara skogsföryngringsatgarders inverkan pa salpeterbildningen i marken och dess betydelse for barraskogens föryngring. [Influence of silvicultural practice on soil nitrification and its importance in the reproduction of coniferous forests.] Skogsvårdsfören. Tidsskr. 16: 1-104. 1918. The lack of reproduction in many Swedish coniferous forests is due, not to any moisture relation, but to a lack of available nitrogen, the transformation of nitrogenous compounds ceasing with the production of ammonia. These soils are mostly acid in reaction, and are not favorable habitats for nitrifying bacteria, especially *Azotobacter*, which requires soils rich in certain salts, especially calcium. Various lichens and mosses, so abundant in these coniferous forests, are indicators of nitrogen deficiency, as are such plants as *Aira flexuosa*, *Arctostaphylos uva-ursi*, and species of *Vaccinium*. Among the indicators of abundant available nitrogen are *Epilobium angustifolium* and *Rubus idaeus*. [See Bot. Absts. 2, Entry 653, also full review by Pearson in Jour. Forestry 17: 69-73. 1919.]—*H. C. Cowles.*

190. HUTCHINSON, A. H. Limiting factors in relation to specific ranges of tolerance of forest trees. Bot. Gaz. 66: 465-493. 7 fig. Dec., 1918.—From data accumulated in personal contact with the forests of northern Ontario, supplemented by the records of such Canadian explorers as BELL, MACOUN and LOW, the author considers the factors efficient in limiting the range of the principal trees composing the forests of eastern Canada. The northern limits of 20 species are plotted upon maps showing temperature and precipitation distribution, and various peculiarities of these limits are discussed. Temperature seems to explain the northern limits of a few species only, the principal ones being *Picea mariana*, *Larix americana* and *Betula papyrifera*, although for these species another factor seems to be involved in Labrador. Water is regarded as the limiting factor in the western extension of *Acer saccharum*, *Tsuga canadensis*, *Fagus americana*, *Thuja occidentalis* and *Ulmus americana*, but other species show irregularities which do not correspond in the least with the water supply. The most important conclusion regarding the time factor in relation to temperature and soil development is embodied in the statement that "deciduous hardwood forest is encroaching upon the coniferous forest region, and that the progress of this encroachment has lagged behind temperature changes, being now dependent upon the rate of soil development."—There follows a discussion of the ranges of tolerance for various species. In this discussion it is interesting to note that *Abies balsamea* is regarded as possessing a wide water range but as seldom thriving except in very moist soil on account of fungous diseases of the roots in drier soil. *Picea canadensis* and *Picea mariana*, possessing the same northward range, are frequently separated by

soil development and soil water the latter species having the wider range of tolerance.—The distribution of *Thuja occidentalis*, while defying explanation on the basis of temperature, water or soil as limiting factors, seems to be explicable on the theory that it has radiated from a limited central area and that migration is still lagging behind ecological conditions. *Pinus Banksiana* on the contrary is regarded as a pioneer form more tolerant of severe conditions than of competition. This accounts for its absence from areas of better soil development.—*Tsuga* is regarded as still migrating and hence showing limits by time rather than by factors of its present environment. Notes are also given on the specific ranges of tolerance of *Larix americana*, *Pinus Strobus*, *Populus balsamifera*, *P. tremuloides*, *Acer saccharum*, *Fagus americana*, *Ulmus americana*, and *Betula lutea*. [See also Bot. Absts. 2, Entry 17.]—Geo. D. Fuller.

191. JOHNSTON, EARL S. A simple non-absorbing atmometer mounting. *Plant World* 21: 257-260. *Fig. 1*. 1918.—A description is given of a mounting that will prevent the absorption of rain and is simpler and less liable to breakage than those previously devised. The principal improvements are the elimination of one of the two mercury valves formerly used and the use of but one tube from the reservoir to the cup. It is claimed that the mounting may be made without employing the services of a skilled glass-blower. Simple but complete directions for its construction are accompanied by a diagrammatic drawing of it as installed. [See also Bot. Absts. 2, Entry 551.]—Geo. D. Fuller.

192. KINCER, JOSEPH BURTON. Relation between vegetative and frostless periods. *Monthly Weather Rev.* 47: 106-110. *Charts 1-8, fig. 1-5*. 1919.—Vegetative temperature defines the potential period of plant growth determined by the spring date when the temperature rises sufficiently to permit action by the protoplasmic content of vegetable cells and the date in the fall when it falls below this point and growth ceases. The frostless period is determined by the dates of the last killing frost in spring and the first in autumn. The average frost-free date both in spring and in fall corresponds to a mean daily temperature of from 52° to 56°, and, when away from marine influence, these values are very uniform under both topographic conditions and over large geographic areas. The average frost date can be more accurately determined from the mean temperatures than from the frost records themselves which are often misleading.—A law of frost occurrence is deduced: "Killing frost occurs each year in spring until the normal mean daily temperature rises to approximately 43°. After this temperature is reached, frost does not occur in all the years, but does occur in more than half the years until the average temperature reaches 54°, which corresponds in data to the average occurrence of the last frost in spring. Thereafter killing frost may be expected with less frequency, or in less than half the years, until the mean daily temperature rises to approximately 63°, after which it is not experienced. This holds good also for fall frost."—Plotting the annual march of temperature and average spring and fall frost dates for successive belts of 3° latitude in width from 29° to 49°, between the Rockies and the Appalachians, a series of paralleled curves results in which the line through frost dates is essentially parallel to the vegetative temperature line of 43°, and 9° higher. The lengths of the seasons are widely divergent, the frostless season varying from 20 days from the northern end of the Mississippi Valley to 100 days in the southern.—E. N. Munnis.

193. KORSTIAN, C. F. Life forms, leaf size and statistical methods in phytogeography. [Rev. of: SMITH, WM. G. Raunkiaer's life forms and statistical methods. *Jour. Ecol.* 1: 16-26. 1913.] *Jour. Forestry* 17: 328-331. 1919.

194. MACKAY, A. H. The phenology of Nova Scotia, 1917. *Proc. and Trans. Nova Scotian Inst. Sci.* 14: 395-402. 1919.

195. MCGREGOR, E. A. The relation of irrigation to humidity in a recently reclaimed desert. *Plant World* 22: 45-52. *3 fig.* 1919.—A study of the average monthly humidity of the Imperial Valley during 1916-1918, and of the relation between irrigation and humidity shows that irrigation has little to do with the humidity of the atmosphere. The humidity curve

for San Diego for the same period is very similar to that of the Imperial Valley, although it is over 100 miles away. The conclusion is reached that no appreciable influence upon the course of humidity through the season is exerted by the amount of irrigation water used. Seasonal humidity fluctuations are to be accounted for through geographically far-reaching meteorological factors.—*Chas. A. Shull.*

196. McLEAN, R. C. Studies in the ecology of tropical-rain forest: with special reference to the forests of south Brazil. I. Humidity. Jour. Ecol. 7: 5-54. 21 fig., 1 pl. May, 1919.—This work was done in the rich forests on the slopes of the hills near Rio de Janeiro, Brazil, a region shown to possess a high average humidity, a mean rainfall of 111.2 cm. (the heaviest rains occurring during the hot months), and a very considerable amount of cloudiness which is also at its height during the hot season. The combination into a single graph of the factors of temperature, rainfall, relative humidity, and sunshine proves the climate to be decidedly periodic, with the most favorable portion of the year for plant development falling within the months extending from December to May. Graphs show that the relative humidity is always high not only within the forest at heights of one and four meters above the soil, but also outside the forest and above the foliage-canopy. Thermographic studies within the forest disclose the fact that the dense layer of terrestrial shrubs seems to divide it into two portions, the lower possessing a climate decidedly cooler and more humid than the brighter regions above. The author conceives that this lower stratum possesses the conditions most unfavorable to vegetation and to it his experimental work is confined.—Experiments show that the highest rate of water loss by transpiration from shade leaves in the lower stratum of the forest is never greater than 0.4 of the evaporation from a free water surface exposed under exactly similar conditions. Transpiration experiments conducted in the laboratory with atmospheric saturation and strong light gave very similar results. Cuticular transpiration from the shade type of leaf is shown to be very slight on account of a rather remarkable amount of cutinization. A comparison of the shade and the sun form of leaves on the basis of inter-cellular space relative to leaf mass shows that in the former it amounts to 24.8 and in the latter to 16.3 per cent. Data were obtained upon the number and size of stomata for undergrowth plants and seem to show that both are rather smaller than in the typical mesophytes of temperate lands. The vascular strands of the petioles of the leaves of such plants are found to be much smaller than those in sun species. These and other data tend to show that in the shade leaves of the forest both the power of root absorption and of conduction are decidedly small and most inadequate to the transpiration capacity of the leaves, hence transpiration even in the protected region of forest undergrowth may, for short periods at least, rise above the low capacity of the plant to supply water. This the author interprets as leading to the development of protective devices even in a very moist habitat.—Under such conditions of depressed transpiration there is, however, no shortage of mineral matter, but on the contrary the leaves of the shade habitats show a relatively richer content than do the heliophytes, proving that here, at least, the absorption of mineral salts is quite independent of foliar evaporation.—In addition to these experimental results there appear in the paper many observations of interest among which may be cited records of the abundance of pulvini, the predominance of the lanceolate leaf-form and the non-importance of the drip-tips of the foliage.—*Geo. D. Fuller.*

197. PAVILLARD, J. Les progrès de la nomenclature dans la géographie botanique. [The development of nomenclature in phytogeography.] Ann. Géog. 27: 401-415. 1918.—The author begins with an historical and critical sketch of the conditions of the past and then proceeds with an analysis of the scope of plant geography. Here it is suggested that it would be desirable to follow the practice of the Swiss school and employ the designation "geobotany" suggested by Grisebach in 1866. Resting upon the two fundamental unities of the species and the association, two main divisions of the science are then made, the one termed geobotany the other plant sociology or phytosociology. Each of these is further subdivided into three parts, giving as the subdivisions of the subject: (1) Floristic geobotany; (2) Genetic geobotany; (3) Ecologic geobotany; (4) Floristic phytosociology; (5) Genetic phytosociology; and (6) Ecologic phytosociology.—*Geo. D. Fuller.*

198. RAUNKIAER, C. Über das biologische Normalspektrum. [Normal biological spectrum.] Kgl. Dansk. Vidensk. Selskab. Biol. Meddel. 1¹: 17 p. 1918.—The author suggests certain changes for the simplification of his life-form system of classification and adds more data to the application of his normal biological spectrum. Analyzing floras from such widely different regions as Denmark, Spitzbergen, Death Valley (Calif.), Georgia, Seychelles, and Alaska he finds that not all of his life-forms are essential to the characterization of their phyto-geographic climates. For the purpose of such characterization he finally reduces his ten life-forms to four, viz., phanerophytes, chamaephytes, hypogeal plants and therophytes. The recalculation of a normal spectrum upon the basis of many more species than originally used for that purpose proves that the earlier calculation was quite accurate. A study of the great taxonomic groups of plants shows that the calculated and experimental results agree and that while the Gymnospermae and Choripetalae are essentially phanerophytic, the Monocotyledonae are characteristically hemicryptophytic and cryptophytic while the Gamopetalae possess a majority of hemicryptophytes. [See also Bot. Absts. 4, Entry 301.]—*H. de Forest and Geo. D. Fuller.*

199. REED, WILLIAM GARDNER. Frost and the growing season. Atlas of Amer. Agric. Part II, Sect. 1. 11 p. 33 fig. 1918.—A series of shaded maps of the United States showing: (1) the average dates of the last killing frost in spring for the different portions of the country; (2) number of times in the given period when the first killing frost of spring was 10 days or more later than the average date; (3) average dates of first killing frosts in fall; (4) number of times in the given period when the first killing frost in fall was 10 days or more earlier than the average date; (5) dates on which the chance of killing frost in spring falls to 10 per cent; (6) dates on which the chance of killing frost in fall rises to 10 per cent; (7) number of times in the period when the season without killing frost was 15 days or more shorter than the average; (8) average number of days without killing frost; (9) available growing seasons in four-fifths of the years. Other interesting data concerning the time of occurrence of killing frost in specific years and places, are mapped and charted. Most of the data is obtained from frost records extending over a period of twenty years (1895-1914). Full rev. by Ward in Geog. Rev. 7: 339-344. 1919.—*P. D. Strausbaugh.*

200. REIDY, MARGARET M. Ecology. School Sci. Math. 19: 131-134. Feb., 1919.—A paper dealing with the pedagogical aspects of ecology.—See Bot. Absts. 2, Entry 894.

201. ROIG, JUAN T. Las maderas de Isla de Pinos. [Kinds of wood on the Isle of Pines.] Revist. Agric. Com. y Trab. 2: 498-500. 1 fig. 1919.—In the course of a collecting trip through the Isle of Pines there were collected 19 samples of wood not in their collection, 150 herbarium specimens and a considerable number of seeds of forest plants. Note was also made of a hundred common names not at present in catalogues and dictionaries. In general the species of trees found were the same as those in certain similar sections of Cuba. In the trip not a single marabou plant was seen. The mallows, *Urena lobata* and *U. sinuata*, were especially abundant about New Gerona. Attention is called to the fact that "sabina de costa" is nearly extinct both in Cuba and the Isle of Pines.—*F. M. Blodgett.*

202. ROWLEE, W. W. Relation of marl ponds and peat bogs. Mem. Brooklyn Bot. Gard. 1: 410-414. 3 fig. 1918.—Two types of filled in lakes and ponds occur in western New York: the peat bog and the marl pond. These differ in respect to the character of the water, the flora of the water, and the manner of filling. Finding many of the peat bogs underlain with marl, the author raises the question as to the possibility of such bogs having previously contained alkaline water which subsequently became non-alkaline. As most of the marl ponds occur in the region near the limestone belt of central New York, and the peat bogs with the greatest amounts of marl under them also occur near this same limestone belt, the author thinks that the above mentioned change has taken place. To quote his words, "The ponds were artesian pools fed by these springs and as the character of the water changed, there was, if our theory is correct, a corresponding change in the flora." *Chara*, a lime-loving plant, removes free lime from the water; rain washes out the lime from the soil, so that eventually the lime content of the pond water would be decreased, and conditions would arise favoring the development of an oxylophyte flora.—*P. D. Strausbaugh.*

203. SAUVAGEAU, CAMILLE. *Recherches sur les laminaires des côtes de France.* [Kelps of the coast of France.] Mem. Acad. Sci. France 56: 240. 85 fig. 1918.—In this paper the details of the life histories and of the morphology of *Saccorhiza bulbosa*, *Laminaria flexicaulis*, *L. Lejolisii*, *L. Cloustonii*, *L. saccharina* and *Alaria esculenta* occupy most of the space and are elucidated by many drawings. There are also notes on the distribution and on the seasonal development that are interesting to the ecologist.—Geo. D. Fuller.

204. SMITH, W. G. Presidential address before the British Ecological Society. Jour. Ecol. 7: 110-116. May, 1919.—The author points out the importance of ecology in solving many of the fundamental problems upon which the economic development of the country depends. Attention was also directed to the increasing tendency in ecological studies to lay stress upon biological factors. Many such factors tend to reduce growth forms from phanerophytes to chamaephytes and ultimately to hemicryptophytes. Prominent among such factors stand fire and grazing, which were shown to be influential in causing the encroachment of grasslands upon forests in such regions as the prairies of North America and the veld of South Africa. In these grasslands certain species appear again and again, probably because: (1) They possess in a high degree the power of shoot production at or near the surface of the soil, resulting in quick renewal after burning or grazing. (2) They are of perennial habit. (3) They have great power of surviving critical periods of winter and drought, as well as having considerable adaptability to habitat.—Geo. D. Fuller.

205. TOUMNEY, J. W. [Rev. of: SAMPSON, A. W. Climate and plant growth in certain vegetative associations. U. S. Dept. Agric. Bull. 700. 1918. (See Bot. Absts. 1, Entry 1155; 2, Entry 226.)] Jour. Forestry 17: 59-62. 1919.—Valuable data have here added to our knowledge of site factors and vegetation through the experiments conducted in the various vegetative types in central Utah, though the correlation fails to bring us to an acceptable method of relating forest vegetation to the complex of physical factors which constitute the environment.—E. N. Munnis.

206. TRUOG, E. Soil acidity: 1. Its relation to the growth of plants. Soil Science 5: 169-195. 1918.—See Bot. Absts. 1, Entry 1393.

207. WEAVER, J. E. The quadrat method of teaching ecology. Plant World 21: 267-283. 7 fig. 1918.—See Bot. Absts. 4, Entry 165.

208. WILLIAMS, KATHERINE A. A botanical study of skunk cabbage. *Symplocarpus foetidus*. *Torreya* 19: 21-29. 2 pl., 13 fig. Feb., 1919.—A general study, largely morphological, but with notes on phenology, distribution, and pollination.—[See Bot. Absts. 2, Entry 931.]

STRUCTURES, BEHAVIOR, SYMBIOSIS

209. ANONYMOUS. Dwarf shore floras. Amer. Bot. 25: 31. 1919.—Land plants that happen to sprout on the shores of rivers and ponds often show dwarfing effects due in part to the withdrawal of water and in part to their becoming established late in the season.—W. N. Clute.

210. ARNELL, H. WILH. *Vårfloran vid Hernösand.* [The springflora around Hernösand, northern Sweden.] (Swedish.) Bot. Notiser 1918: 169-209. Tab. 1-3. 1918.—The time of anthesis of 190 spring flowers, and in many cases also the time of opening of the leaf-buds, are given, together with other notes. The records were kept during the years 1875-1881. A comparison is also made between the dates of the appearance of spring at Jömköping, Upsala, Gefle, and Hernösand, the difference in latitude counted from the first named city being respectively 2, 3, and 5 degrees and the difference in the dates of beginning of spring being 8, 13, and 34 days respectively.—P. A. Rydberg.

211. BRADSHAW, R. V. Variations in *Calypso*. Amer. Bot. 25: 152. 1919.—*Calypso bulbosa* reported to vary in fragrance with the locality.—W. N. Clute.

212. BURKILL, I. H. Some notes on the pollination of flowers in the Botanic Gardens, Singapore, and in other parts of the Malay Peninsula. *Gardens' Bull. Straits Settlements* 2: 165-176. 1919.—An account is given of observations on flowers visited by *Xylocopa*, *Anthophora*, *Melipona*, *Vespidae*, butterflies and moths, and sun-birds.—S. F. Trelease.

213. CANNON, W. A. Root-growth of *Prosopis velutina* and *Opuntia versicolor* under conditions of a small oxygen supply in the soil. *Carnegie Inst. Washington Yearbook* 16: 82-83. Feb., 1918.—In *Prosopis* growth continued for some time in an atmosphere of 2.67 per cent oxygen, but in *Opuntia* it stopped promptly. In an atmosphere of 4.56 per cent oxygen the longer roots of *Prosopis* continued growth for five days while those of *Opuntia* ceased entirely at the end of 48 hours.—Geo. D. Fuller.

214. CANNON, W. A. Relation of the rate of root growth of *Prosopis velutina* to the temperature of the soil. *Carnegie Inst. Washington Yearbook* 16: 82. Feb., 1918.—Growth in this species occurred at temperatures ranging from 12°C. to 42°C. with an optimum at 34°C. The rate of growth was also found to be correlated with the length of the root being greater in roots less than 50 mm. in length.—Geo. D. Fuller.

215. CREMATA, MERLINO. Plantas melíferas. [Melliferous plants.] *Revist. Agric. Com. y Trab.* 2: 140-152. 10 fig. 1919.—A list of plants in Cuba visited by bees arranged alphabetically by families is given with notes on importance, time of flowering, and distribution.—F. M. Blodgett.

216. DENIS, MARCEL. Sur quelques thalles d'*Aneura* dépourvus de chlorophylle. [On certain thalli of *Aneura* devoid of chlorophyll.] *Compt. Rend. Acad. Sci. Paris* 168: 64-66. 2 fig. Jan., 1919.—While *Aneura* commonly harbors an endophytic fungus, comparable to mycorrhiza in vascular plants, the species here described has an unusual development of endophytic fungi. Apparently as a result of this symbiosis, the liverwort is without chlorophyll and has a coralloid appearance, and thus appears to depend upon the fungus for its nourishment. Comparison is made with the gametophyte of *Lycopodium*, which also may or may not possess chlorophyll, depending on the species. [See Bot. Absts. 2, Entry 982; also rev. by Magrou in *Bull. Trimest. Soc. Mycol. France* 35: 164. 1919.]—H. C. Cowles.

217. DOSDALL, LOUISE. Water requirement and adaptation in *Equisetum*. *Plant World* 22: 1-13, 29-44. 5 fig. 1919.—The current views of bog xerophytism are summarized. From a study of the soil water requirements and transpiration of *Equisetum fluviatile* as compared to *Ranunculus sceleratus* and *Helianthus annuus*, the author concludes that *E. fluviatile* is not to be considered a xerophyte growing in xerophytic parts of bogs because of low absorptive powers, but is a true hydrophyte, possessing only superficial xeromorphy. It is thought that the superficial xerophytic appearance of *Equisetum* was acquired in some cold, arid period of geological history, and that the structures are extremely stable. Adaptation to hydrophytic conditions has come about through the development of air spaces, diaphragms, and permanently open stomata, without modification of the external xeromorphy. Transpiration is twice as rapid per unit area in *E. fluviatile* as in the sunflower which is noted for its rapid use of water. It therefore belongs in the hydrarch succession, to the reed swamp or sedge-swamp association. *E. hyemale* and *E. arvense* are more mesophytic. High transpiratory activity of *E. fluviatile* is correlated with low photosynthetic efficiency as compared to *Phaseolus vulgaris* and *Ranunculus*.—Chas. A. Shull.

218. FARR, C. H. The ferns of the rain-forest. *Sci. Monthly* 9: 19-31. 30 fig. 1919.—Tree ferns grow in the most evenly tempered climates and cannot endure strong winds nor direct sunlight. The mountain forest of the tropics furnishes ideal conditions for them. In the old world tree ferns are distributed between 47 degrees south and 32 degrees north latitude. They are most abundant in Australia and the Pacific Islands, although numerous in Ceylon, Java and New Zealand. In the western hemisphere, their distribution is from about 44 degrees south to 25 degrees north latitude. The Hawaiian Islands, the Antilles, the Andes,

and Central America have many, but they are abundant in Jamaica. There are four genera and about 200 species in the family Cyatheaceae, not all of which are tree ferns. *Cyathea* reaches its greatest development in Jamaica, where *C. furfuracea* and *C. pubescens* reach a height of more than 40 feet. In Australia, *Dicksonia* may be 60 feet and *Alsophila*, the tallest of them all, may be 80 feet in height. Tree ferns rarely branch. Leaves of *Alsophila pruinata* measure from 16 to 18 feet in length.—*L. Pace*.

219. FRIES, THORE C. E. Experiment över Björkens Lövspäckning i Skogsgränser och i Dalbottnar. [Experiments on the foliation of birches in forest areas and in valley bottoms.] Svensk. Bot. Tidskr. [Stockholm] 13: 43-47. 1919.—A phenological study of the relative conditions necessary for development of the leaf-buds of different species of birches in mountain localities as compared with valleys. The same species begin to develop at lower temperatures in the valleys than on the mountains and the author concludes that the trees to a large extent adjust themselves to the conditions under which they grow.—*W. W. Gilbert*.

220. FROGGATT, W. W. Ants and flowers. Australian Nat. 4: 88. 1919.—Note only. Native bees visit flowers of *Capparis mitchelli* at night because mound ants prevent access by day.—*T. C. Frye*.

221. FRÖDIN, JOHN. Några ord med anledning af Aug. Heintzes uttalanden om *Potentilla multifida* spridningsbiologi [A few words on Aug. Heintze's remarks concerning the distribution biology of *Potentilla multifida*.] [In Swedish.] Bot. Notiser 1919: 137-138. 1919.—The author takes exception to Heintze's suggestion that this species may have been carried from Scandinavia to the alps by means of the reindeer-raven, in a manner similar to *Draba nemorosa* and *Potentilla argentea*. In order to support such a theory it would be necessary to prove: (1) that the seeds of this species would not lose their power of germination in passing through the intestines of such animals; (2) that there is any evidence of migration by these animals between the northern mountains and the southern.—*P. A. Rydberg*.

222. FULLER, GEORGE D. Ecological anatomy of leaves. [Rev. of: HANSON, HERBERT C. Leaf structure as related to environment. Amer. Jour. Bot. 4: 533-560. 21 fig. 1917. (See also Bot. Absts. 4, Entry 233.)] Bot. Gaz. 65: 487-488. 1918.—See Bot. Absts. 1, Entry 1326.

223. GARSIDE, S. Pollen presentation in *Cryptostemma calendulaceum*. R. Br. Ann. Bolus Herb. 2: 149-152. 1 pl. June, 1918.—The elongation of the style of this composite is very rapid, the process being completed in five minutes under favorable conditions. The extended style is sensitive to contact stimulus, and when the inflorescence is visited by a bee, all the styles that receive blows bend toward the insect, whereupon the pollen is effectively removed.—*H. C. Cowles*.

224. HAMILTON, A. G. The effect of sunlight on plants. Australian Nat. 4: 89-90. 1919. Some of the effects given in the form of a summary.—*T. C. Frye*.

225. HAMILTON, A. G. Pollination of some Australian plants. Australian Nat. 4: 75-81. 1919.—Adaptations to cross pollination in the flowers of some Australian plants.—*T. C. Frye*.

226. HARVEY, R. B. Importance of epidermal coverings. Bot. Gaz. 67: 441-444. 2 fig. May, 1919.—Undercooling of the tissues occurs to a greater degree in such herbaceous plants as possess protective epidermal coverings than in plants not so protected. The undercooling in such plants is not due to substances in the cell sap, but mainly to the prevention of inoculation from ice formed on the surface of the tissue. A method is given for determining electrically the temperatures within leaf tissues.—*R. B. Harvey*.

227. HAYDEN, ADA. The ecologic foliar anatomy of some plants of a prairie province in central Iowa. Amer. Jour. Bot. 6: 69-85. 3 pl. Feb., 1919.—Studies were made on the leaf anatomy of 28 species of prairie plants, 12 species being chosen from slopes and hill crests and 16 from alluvial basins. Prairie plants as a whole show a xerophytic tendency in leaf

structure, as indicated by specialized palisade tissue, water storage tissue, and a thick-walled epidermis, with or without trichomes. Xerophytism, however, is indicated not so much by these characters taken alone as by their correlation with other features, such as extensive root systems. Upland plants have a thinner epidermis than have lowland plants. 75 per cent of the upland species have trichomes, while 70 per cent of the lowland species are without them. 50 per cent of the lowland species have bifacial leaves, while but 33 per cent of the upland species possess them. Half of the upland species have centric to subcentric leaves, while only 12.5 per cent of the lowland species may be so classed. [See Bot. Absts. 2, Entry 978.]-H. C. Cowles.

228. HAYDEN, ADA. The ecologic subterranean anatomy of some plants of a prairie province in central Iowa. Amer. Jour. Bot. 6: 87-105. 14 pl. Mar., 1919.—Subterranean organs were studied in 26 species of prairie plants, 15 being upland species, and 11 species of alluvial basins. In the upland species there is a tendency to the production of prominent mechanical tissue; except in a few cases (as in *Spartina Michauxiana* and *Panicum virgatum*). In the lowland species mechanical tissues are moderate or lacking. In general parenchymatous tissue is reduced in the upland species and prominent in the lowland species, aerenchyma being present in the swamp plants. Vascular tissue appears to vary more taxonomically than ecologically. Subterranean stems tend to predominate in moist lowlands as an equivalent of primary roots and are more efficient than roots in propagation. The stem pith serves as a water reservoir. [See Bot. Absts. 2, Entry 745.]-H. C. Cowles.

229. HEINTZE, AUG. Till kännedomen om *Potentilla multifida*s spridningsbiologi. [The distribution biology of *Potentilla multifida*] (Swedish). Bot. Notiser 1918: 302-206. 1918.—Records of occurrence of this species are given from Graubünden and the East Alps. In the Alps it is evidently distributed by sheep, chamois, and other animals. It was probably carried to the Alps by reindeer-raven. In an appendix, the author enumerates several other species, which spread from seeds passed through the intestines of animals.—P. A. Rydberg.

230. HEINTZE, AUG. Om endo- och synzoisk fröspridning genom europeiska kråkföglar [Endo- and syn-zoic dispersal of seeds by European Corvidae]. (Swedish.) Bot. Notiser 1917: 209-240. 297-300; 1918: 1-47. 1918.—The studies include the following birds: *Pica pica*, *Corvus cornix*, *C. corone*, *C. frugilegus*, *Coloeus monedula*, *Corvus corax*, *Pyrrhocorax pyrrhocorax*, *P. graculus*, *Crates infaustus*, *Nussifraga caryocactes*, and *Garrulus glandarius*. Nearly all of these distribute plants which bear berries or stone-fruits. The seeds or stones of these are not at all or only partly damaged in the crop. All the larger, most of the middlesized, and half of the smaller seeds or fruits are dispersed in a hemi-endozoic way, i.e., they are regurgitated in the balls of castings, mostly in the evening after the birds have gone to rest; the rest pass through the intestines. *Nussifraga* usually breaks the stone before swallowing both the seeds and the fragments of the shells. *Garrulus* only occasionally makes castings and is of less importance in endozoic distribution. Both of these are important, however, in the distribution of larger nuts, as those of the oak, beech, hazel, walnut, chestnut, and piñon, which they bury like squirrels for winter food. The species of *Corvidae* also eat excrements of mammals, and are themselves eaten by owls, hawks, martens, etc., and thus constitute links in chains of dispersal, whereby seeds are carried long distances. They also eat young birds and rodents, and carrion, and disperse seeds in the same way as the birds of prey. Most of them are more or less migratory and therefore often carry the seeds long distances. The author enumerates 151 species of plants which he has found distributed by different species of *Corvidae*. The list of reference literature numbers 139 titles.—P. A. Rydberg.

231. HENDRICKSON, A. H. The common honey bee as an agent in prune pollination. California Agric. Exp. Sta. Bull. 291: 215-236. 13 fig. Jan., 1918.—See Bot. Absts. 2, Entry 726.

232. HESSELMAN, HENRIK. Iakttagelser över Skogsträdspollens Spridningsförmåga. [Dissemination of pollen from forest trees.] Meddel. Statens Skogsförsöksanst. 16: 27-60. Fig. 1-3. 1919.—The author studied the pollen dissemination of forest trees by placing petri-

dishes containing glycerine-soaked filter papers on board 2 light-ships stationed 3 and 5.5 miles from the shore in the Gulf of Bothnia, Sweden. From May 16 to June 26, 1918, the total number of grains collected on a square millimeter of surface was 16.2 at 3 miles and 8.8 at 5.5 miles. Spruce (*Picea excelsa*) and birch (*Betula spp.*) were almost equally represented, with considerably less of pine (*Pinus sylvestris*), and very few of all other species. Other investigations and observations are cited to show that pollen grains may be carried by wind as much as 70 to 90 miles. This factor tends to counteract the development of local climatic forms or races of trees. It operates most effectively in the case of species such as the spruce which commonly open the pistillate flowers in advance of the staminate, and least effectively in species such as the pine in which this relation is reversed. This factor is suggested as accounting for the greater prevalence of "climatic races" in pine than in spruce. It is also pointed out that in plant breeding experiments it is of great importance to determine whether the individuals from which seed is collected blossomed earlier or later than their associates. Another field which is touched upon is that of paleobotany, in so far as the fossil flora of a region is determined by the occurrence of pollen grains, it being pointed out that the presence of fossil pollen grains of a given species is by no means certain evidence that the species occurred in the immediate locality, since the pollen grains may have been carried from a remote region. [See also Bot. Absts. 4, Entry 253.]-G. A. Pearson.

233. HODSON, ELMER R. [Rev. of HANSON, HERBERT C., Leaf structure as related to environment. Amer. Jour. Bot. 4: 533-560. 1917.] Jour. Forestry 17: 186-188. 1919.—Work differs from usual methods in that the environmental factors were measured. Leaves of the interior of the crown were compared with those in the periphery on the south side and those on the outside had much thicker leaves than those on the inside, the difference being greater than the differences between mesophytic and xerophytic leaves. Evaporation was from 1.5 to 2.3 times as great at the periphery as in the crown, humidity was from 1 to 6 per cent higher in the crown, while the temperature was from one to two degrees lower in the crown than in the periphery. Leaves on the outside of the crown lose more water per unit area than center leaves, while they were in general smaller, deeper lobed and had a lower water content. [See Bot. Absts. 1, Entries 1326, 1328.]-E. N. Munns.

234. HOWE, INEZ ADDIE. November flowers in northern Vermont. Rhodora 21: 170. 1919.—A list of 44 species of plants which were found flowering in the neighborhood of the Fairbanks Museum at St. Johnsbury, Vermont, and were exhibited on the flower table at the museum between the first and the twenty-second of November. These were all cases of either second or continuous blooming resulting from the unusually wet, mild weather of October and November 1918.—James P. Poole.

235. HUTCHINSON, J. The rain tree of Hierro, Canary Islands [*Oreodaphne foetens*]. Kew Bull. Misc. Inf. [London] 1919: 153-164. 3 fig. 1919.—The peculiar features of this tree were known to the Romans who considered this island to be the western boundary of the world. This tree, like other species of Lauraceae, is shown to be an important agent in the condensation of moisture from the clouds. It is suggested that the judicious planting of such trees might so far increase the soil moisture as to make possible a considerable extension of banana culture in the Canaries. A critical and historical study is given of the efficiency of this tree in the condensation of water.—E. M. Wilcox.

236. JEKYLL, GERTRUDE. Pollination of *Viscum album*. Jour. Botany 57: 286. 1919.—A brief record is given of an experiment in pollinating this plant. It is claimed that the presence of fertilized fruit inside of the mesh inclosure supports the results of experiments by DOM ETHELBERT HORNE which seemed to show fertilization is not necessarily due to bees and flies, as was claimed by Koelreuter, Kirschner and Loew.—K. M. Wiegand.

237. KING, C. M., G. J. RINGLAND, AND HEMENWAY MARTHA. Blooming time of Iowa plants 1918.—Rept. Iowa State Hortic. Soc. 53: 226-231. 1918.—Paper gives the blooming time of the common plants of Iowa at three different places; Ames, Boone and Lansing, with additional notes on the blooming of a few plants at Davenport and Council Bluffs, Kansas City, Missouri, and Manhattan, Kansas; also weather notes.—L. H. Pammel.

238. KNOLL, FRITZ. Gibt es eine Farbendressur der Insecten? [Are insects trained in the recognition of colors?] *Naturwissenschaften* 7: 425-430. 1919.—The question of the uniform attraction of certain colors for the honey bee and a few other insects is discussed. The paper contains many field observations on the color of the flowers visited by the insects. By certain procedures the attraction of the insects by means of chemical substances (odors, honey, etc.) is excluded. The insects worked with seem to be color-blind to reds and greens but in no case are they entirely color-blind.—Orton L. Clark.

239. KRAUS, E. J., AND H. R. KRAYBILL. Vegetation and reproduction with special reference to the tomato. *Oregon Agric. Exp. Sta. Bull.* 149. 90 p. 22 fig. 1918.—See Bot. Absts. 1, Entry 1402; 3, Entry 1487.

240. LOHR, P. J. Untersuchungen über die Blattanatomie von Alpen- und Ebenen-pflanzen. [Investigations on the leaf anatomy of alpine and lowland plants.] *Recueil Trav. Bot. Neerland.* 16: 1-62. Fig. 1a-4b (8). Tab. 12. 1919.—The author investigates the leaf structure in a large number of alpine plants and those of ordinary level in Switzerland (168 species in 98 genera). The tissue volume is measured by micrometer, and an average of at least three specimens considered as standard. The injection method of Unger with modifications is used for the determination of the intercellular volume, which is found hydrostatically. A special method is used for small leaves as in *Empetrum nigrum*. From six to fifty leaves of every specimen are taken for determination and margins of error estimated. The leaf characters studied are: (1) thickness, (a) influence of exposure to light, (b) altitude under same exposure, (c) soil under same conditions; (2) epidermal structure, (a) thickness of cuticle, (b) thickness of epidermis, (c) distribution of stomata; (3) mesophyll structure, (a) influence of exposure on relative volume of palisade and aeration tissues, (b) influence of moisture in formation of same, (c) isolateral and dorsiventral leaves; (4) intercellular volume, (a) influence of exposure, (b) altitude, (c) soil moisture, (d) nature of substratum; (5) weight of dried and live leaves. The author concludes that there is no characteristic leaf structure for all alpine plants, since they are too much affected by location and other things that also determine the structure of lowland plants under similar conditions. A greatly developed cuticle is the only character that seems to be a mark of alpine plants. Thickness of leaf in sun plants is emphasized in alpine conditions, shade leaves being relatively thinner.—J. A. Nieuwland.

241. LONG, FRANCES LOUISE. The quantitative determination of photosynthetic activity in plants. *Physiol. Res.* 2: 277-300. June, 1919. [Serial no. 16.]—Influence of light intensity, submergence under water, infection by parasites, etc., on net photosynthetic activity of leaves. [See Bot. Absts. 3, Entries 1375, 1452, 2685, 2833.]—B. E. Livingston.

242. LUMSDEN, D. Orchid breeding. *Jour. Internat. Gard. Club* 2: 203-212. 5 fig. 1918.—A genetical paper with remarks on symbiosis in orchids. Root fungi are regarded as necessary for the successful growth of orchids, especially in the seedling stage. The relationship is regarded as one of mutual parasitism. A separate organism is required for each tribe, and often for each genus and species. [See Bot. Absts. 2, Entry 950.]—O. E. White.

243. LUNDEGÅRDH, HENRIK. Ekologiska och fysiologiska studier på Hallands Väderö. II. Till kännedom om strandväxternas fysiologi och anatomi. [Ecological and physiological studies on Hallands Väderö, Physiology and anatomy of the shore plants.] (Swedish, with English summary.) *Bot. Notiser* 1919: 1-39. 1919.—In 1917 an ecological station and a physiological laboratory were established on Hallands Väderö, a small island in the Kattegat, off the west coast of Sweden. In part I (*Bot. Notiser* 1918; see Bot. Absts. 4, Entry 292) a vegetation analysis was made after the Raunkiaer method, and comparison made with other localities. The osmotic pressure of the leaf cells was determined for most of the halophytes, and the mesophyll was found generally to have a greater pressure than the epidermis. A low pressure was found in the succulents, *Sedum maximum* and *Suaeda maritima*. A moderate pressure was found in the halophytic and somewhat succulent *Cochlearia officinalis*,

Crambe maritima, and *Honckenya peploides*, possibly because they occur well up on the beach where the salt percentage is low. Higher pressures were found in *Spergularia salina*, *Scirpus maritimus*, and *Armeria elongata*. The highest pressure was found in *Atriplex latifolium*, which explains the presence of this species down to the littoral zone. The permeability of several halophytes for NaCl and other salts was determined by the Fitting method, and was found to be so slight as scarcely to be measurable; this slight permeability may be regarded as a high tide adjustment, preventing plants from taking up too much salt. The power of keeping down salt accumulation also may determine how far down toward the sea a plant may extend its habitat. The transpiration of halophytes was found uniformly to be less than that of mesophytes. Sun and shade forms of *Sedum maximum* and *Solanum dulcamara* have about the same osmotic pressure. *Atriplex latifolium* has two forms, a pale yellowish green littoral form, and a deep green supra-littoral form; the latter has twice as many stomata as the former, and the transpiration is proportionally greater.—H. C. Cowles.

244. MACDOUGAL, D. T., H. M. RICHARDS, AND H. A. SPOEHR. Basis of succulence in plants. Bot. Gaz. 67: 405-416. May, 1919.—A *Castilleja* native to the region about Carmel, California, includes two habitat forms, genetically identical, a thin-leaved forest form and a fleshy-leaved shore form. The thin leaves show an acidity double that of the fleshy type, and have a greater dry weight. The fleshy leaves present swelling reactions similar to those of sections of *Opuntia*, indicative of cells high in pentosans or mucilages. The thin leaves swell more in acid than in alkaline solutions. Differences in the swelling reactions of dried leaves of both kinds are to be ascribed to the adsorption of the contained acids and salts of different amounts in the two cases on cell colloids, high in pentosans in one case and hence presenting characteristic coagulatory effects. The reduction of the water content of the cell below a certain point results in the conversion of polysaccharides, which do not show a high inhibition capacity, to pentosans, which mixed with nitrogenous substances have an enormous hydration capacity. Succulence, therefore, may be a direct result of aridity. High acidity, contrary to general impression, may not be taken as a result of succulence. It is more probable that succulence may develop only in plants which have a carbohydrate metabolism characterized by large acid residues.—H. C. Cowles.

245. MAGROU, J. L'immunité dans la symbiose. [Immunity in symbiosis.] Ann. Inst. Pasteur 32: 37-47. Pl. 1918.—See Bot. Absts. 2, Entry 193.

246. MCATEE, W. L. Summary of notes on winter blooming at Washington, D. C. Proc. Washington [D. C.] Biol. Soc. 32: 129-132. 1919.—Due to the mild winter of 1918-19 unusual flowering phenomena occurred in the neighborhood of Washington, D. C. The author divides these phenomena into four groups, viz.: Autumnal flowering, late flowering, early flowering, and casual flowering. Lists are given of the plants in which such phenomena were found.—J. C. Gilman.

247. McDougall, W. B. The classification of symbiotic phenomena. Plant World 21: 250-256. Oct., 1918.—Symbiosis is defined as the living together of dissimilar organisms, and symbiotic phenomena classified as disjunctive or conjunctive. Each of these two main divisions is subdivided into social and nutritive. And nutritive symbiosis, whether disjunctive or conjunctive, is further classified as antagonistic or reciprocal. Examples are cited.—Chas. A. Shull.

248. MIEHE, HUGO. Anatomische Untersuchung der Pilzsymbiose bei *Casuarina equisetifolia* nebst einigen Bemerkungen über das Mykorrhizenproblem. [Anatomical studies on fungal symbiosis in *Casuarina equisetifolia* with some remarks on the mycorrhiza problem.] Flora 11-12: 431-449. 1 pl., 2 fig. 1918.—The roots of *Casuarina equisetifolia*, growing on coral islands near Java, bear structures very similar to the root tubercles of the alder. These tubercles were found to consist of closely compacted masses of numerous, freely-branching, shortened rootlets, certain of the cortical cells of which contain the hyphae of a fungus. The author designates these tubercles "Rhizothamnien," and ascribes their formation to the in-

fluence of the invading fungus. The morphology of the infected host tissues and also that of the invading mycelium is presented in considerable detail. Microchemical studies showed that the walls of the invaded host cells become lignified as a specific reaction to the infection. These "Rhizothamnien" occur on all roots of *Casuarina equisetifolia* growing on its native habitat, but they were entirely absent from plants grown under greenhouse conditions in the botanical garden at Leipzig. The author compares the inter-relation of fungus and host in this particular instance with other mycorrhizal relationships which have received careful study. He believes this to be a case of typical symbiosis in which the fungus may be of use to the host plant in working over nitrogenous materials derived from the humus of the soil into such forms as can be used directly in the metabolism of the plant.—*P. D. Strausbaugh.*

249. NAKAJIMA, Yôzô. Midzu-ohbako no kwajitsu no hôkwai genshō ni suite. Ueber das Verbreitungsmittel der Samen von *Ottelia alismoides* Pers. [On the method of seed dissemination of *Ottelia alismoides* Pers.] [Title in Japanese and German, text in Japanese.] Bot. Mag. Tokyo 33: 44-52. Mar., 1918.—The fruit of *Ottelia alismoides* discharges its seeds after it has floated up to the water surface or while rising to the surface. Dissemination takes place by means of a special disintegration of the fruit shell, in which the component cells become dispersed in the water. This disintegration can be hindered or stopped if the tissue is placed in a 20 per cent aqueous cane-sugar solution or in a 2 per cent KOH solution. It is concluded that this effect may be due to the lowering of turgor in the cells of the fruit tissue.—*K. Morita.*

250. NARASIMHAN, M. J. A preliminary study of root-nodules of *Casuarina*. Indian Forester 44: 265-268. June, 1918.—See Bot. Absts. 1, Entry 1454; 3, Entry 111.

251. NEGER, F. W. Die Wegsamkeit der Laubblätter für Gaze. [Gas passage-ways in leaves.] Flora 11-12: 152-161. 1918.—A comparison of different leaf types as to their aeration systems, and the degree of connection between intercellular spaces.—See Bot. Absts. 2, Entry 619.—*H. C. Cowles.*

252. NELSON, J. C. Flowers of varying color. Amer. Bot. 25: 96-99. 1919.—Forty-nine flowers that have different color forms, 43 that have two or more colors in their blossoms, and 8 that change color in blooming are listed.—*W. N. Clute.*

253. [NORDSTEDT, C. F. O.] [Swedish rev. of: HESSELMAN, H. Iakttagelser över skogsträdspollens spridningsförmåga. (Observations on the dispersal capacity of forest tree pollen.) Meddel. Statens Skogsförsöksanstalt 16: 27-60. 3 fig. 1919. See Bot. Absts. 4, Entry 232.] Bot. Notiser 1919: 167-168. 1919.

254. [NORDSTEDT, C. T. O.] [Swedish rev. of: RESVOLL, T. R. Om planter som passer till kort og kold sommer, 224 p. No date on citation given. Regarding plants which are fit for a short and cold summer]. Bot. Notiser 1918: 139-140. 1918.—*P. A. Rydberg.*

255. OSTERHOUT, W. J. V. Endurance of extreme conditions and its relation to the theory of adaptation. Amer. Jour. Bot. 5: 507-510. Fig. 1. Dec., 1918.—A species of *Tradescantia* (*T. fluminensis*?) is found to resist equally extremes of drought and of moisture. Pieces of this plant lying on the laboratory table, deprived of soil and all sources of moisture supply except the air continued to live and grow for nearly two years. They lost from 10.5 to 95 per cent in weight but increased as much as 150 per cent in length. Subsequently these same pieces planted in soil in a saturated atmosphere grew vigorously and normally. Even when submerged in running water, some of them remained alive and grew slightly for the period of one month when the experiment was discontinued. The author believes that "the explanation of such cases must be sought in physical or chemical conditions of the protoplasm which arise without reference to direct adaptation" and "that many cases now regarded as adaptation may prove to be fictitious." [See Bot. Absts. 2, Entry 1128.]—*P. D. Strausbaugh.*

256. PEARSON, G. A. The relation between spring precipitation and height growth of western yellow pine saplings in Arizona. Jour. Forestry 16: 677-689. 3 fig. 1918.—See Bot. Absts. 2, Entries 382, 552.

257. PETHYBRIDGE, GEORGE H. Heterocarpy in *Picris echioides*. Irish Nat. 28: 25-32. Pl. 3. 1919.—An unknown seed which occurred as an impurity in lucerne seed proved on germination to be *Picris echioides*. This new seed is described as looking like a “peeled banana” and differs from the usual type. Later studies showed that the flower head had on the average 67 ligulate flowers; three or four of these situated next the bracts, differed slightly from the others and those produced the peculiar fruit. These two types are referred to as disc and ray florets. The seeds from the ray florets are gripped by the bracts and remain attached to the head after the other seeds have been dispersed by the wind. The suggestion is made that the whole head may be carried by animals and hence the plant has two methods of seed dispersal. No difference was observable between the plants raised from the two types of seed.—W. E. Praeger.

258. PULLING, HOWARD E. Root habit and plant distribution in the far north. Plant World 21: 223-233. 1 fig. Sept., 1918.—Describes the root habits of some northern trees. The roots of *Picea mariana*, *Larix americana*, and *Betula papyrifera* have a rigid shallow root habit, *Picea canadensis* a flexible shallow habit. *Populus balsamifera* is deep rooted and flexible, and *Pinus banksiana* and *Pinus strobus* have a deep rigid root habit. The degree of flexibility and degree of penetration in deep soils may be a determining factor in the northward distribution of many plants regardless of environmental influences which may exclude other species from those regions. [See Bot. Absts. 2, Entry 288; also rev. by Korstian in Jour. Forestry 17: 327-328.]—Chas. A. Shull.

259. RENDLE, A. B. Some cases of adaptation among plants. Jour. Quekett Microsc. Club 14: 23-28. 1919.—Address of president. Primary and secondary adaptations are described in *Drosera*, orchids, and grasses. It is noted also that there are many forms and structures whose evolution we are quite unable thus far to relate to environment.—H. C. Cowles.

260. RIGG, GEORGE B. Growth of trees in sphagnum. Bot. Gaz. 65: 359-362, Apr., 1918.—Data from the Puget Sound region and Alaska show that trees grow very slowly in sphagnum. The western hemlock (*Tsuga heterophylla*) is the commonest tree in sphagnum in the Puget Sound region, and shows less growth retardation than any other species observed. In Alaska bogs conifers growing in *Sphagnum* are much distorted and frequently are prostrate, while in the bogs about Puget Sound, trees growing in sphagnum are erect though reduced in size. [See Bot. Absts. 1, Entry 193.]—H. C. Cowles.

261. SEDGWICK, L. J. Analyses of some morphological characters of Bombay woody species from an ecological standpoint. Indian Forester 45: 193-199. 1919.—An analysis of the woody species of Bombay as to leaf-apex armature and seed dispersal shows that there is a definite relation between the forms and the environment.

	APICES				ARMATURE		
	Number of species	Acute	Sub-obtuse	Obtuse	Number of species	Unarmed	Armed
Evergreen	393	324	41	28	400	362	38
Deciduous	130	82	14	34	136	114	25
Xerophytic	94	33	13	39	108	69	39
Maritime	28	11	4	13	28	28	

It is believed that these tendencies are the result of development due to environment.—E. N. Munn.

262. SHARPLES, A. The laticiferous system of *Hevea brasiliensis* and its protective function. *Ann. Botany* 32: 247-257. 1918.—See Bot. Absts. 1, Entry 1409.

263. SHREVE, FORREST. The Jamaican filmy ferns. *Amer. Fern. Jour.* 3: 65-71. Sept., 1918.—Though forty-nine species of filmy ferns have been reported for Jamaica, the author was able to find but thirty-three; eighteen of *Trichomanes* and fifteen of *Hymenophyllum*. These filmy ferns show a considerable diversity of habit, structure, and habitat which does not seem to be true of those from Ceylon and Java. An abundant supply of surface moisture is necessary because of the delicate structure of the fronds which are but one cell thick and have no epidermis, stomata or intercellular spaces. They occur on the deeply shaded floor of the lowland forests; at higher elevations, where the moisture is more abundant, they grow as climbers or epiphytes above the forest floor. Brief descriptions are given of some of the main types, and attention is directed to two special adaptive features; (1) in some of the more segmented forms a hairy coat is developed which aids in the retention of moisture, thus preventing extreme desiccation; (2) some of the epiphytic forms growing well above the forest floor where the air is relatively dry have undergone a physiological adaptation by reason of which the cells are enabled to lose a great amount of water for a short period without serious results.—P. D. Strausbaugh.

264. SMALL, JAMES. The origin and development of the Compositae. Chapter IX. Fruit dispersal. *New Phytol.* 17: 200-230. 4 fig. Nov., 1918. Experiments with a special apparatus on the fruits of *Taraxacum* and other composites definitely prove the efficiency of pappus in wind dispersal over wide areas. Discrepancies with observers who have minimized the efficiency of pappus are explained by assuming that the problem is one of hydrodynamics, instead of hydrostatics, as it has been commonly regarded. A pappose fruit is more comparable to an aeroplane or kite than to a parachute or balloon. It is concluded that with a relative humidity not exceeding 0.77, a horizontal wind with a velocity of 1.97 miles per hour can transport a *Taraxacum* fruit any distance; when the air becomes moist, the pappus closes up and the fruit falls to the ground. A pappose composite fruit under proper meteorological conditions can be blown many hundreds of miles, thus doing away with the necessity of postulating land bridges, in order to account for the presence of the Compositae on oceanic islands. This is an important point, because this family is almost certainly of recent origin. [See also Bot. Absts. 2, Entry 75.].—H. C. Cowles.

265. STAKMAN, E. C., AND M. N. LEVINE. Effect of certain ecological factors on the morphology of the urediniospores of *Puccinia graminis*. *Jour. Agric. Res.* 16: 43-77. Jan., 1919.—An attempt to ascertain whether the structure of the urediniospores of biologic forms of *Puccinia graminis* changes readily in response to environmental conditions. It is concluded that these biologic forms are as constant morphologically as they are parasitically, and that the morphologic differences between them are as considerable and as distinct as between many established species of fungi. The morphologic stability of a biologic form is exhibited in the constancy of size, shape, and color of the urediniospores; oat stem-rust (*Puccinia graminis avenae*) is an exception in that the urediniospores are very plastic in respect to shape and size. [See Bot. Absts. 2, Entry 1081. Also abst. in Exp. Sta. Rec. 40: 641-642. 1919.].—H. C. Cowles.

266. STEVENS, O. A. The panurgine bees of North Dakota and a new *Epeolus*. *Canadian Entomologist* 51: 205-210. 1919.—A list of the flower visiting bees, together with the names of the plants at whose flowers they were found. The locality and dates given for the collection of the bees give also an index to the flora and the time of blooming of the species cited. *Petalostemon villosus* is reported to occur only near Sheldon, whereas *P. oligophyllum* and *P. purpureum* are common throughout the state.—Wanda Weniger.

267. TISCHLER, G. Untersuchungen über den anatomischen Bau der Staub- und Fruchtblätter bei *Lythrum Salicaria* mit Beziehung auf das "Illegitimitätsproblem." [Studies on the anatomical structure of the stamens and pistils of *Lythrum Salicaria* with relation to the

problem of "illegitimacy."] Flora 11-12: 162-193. 1 pl. 8 fig. 1918.—The pollen of the small and middle-sized stamens is stunted. The stamens themselves may be regarded, not as adaptations, but as structures whose growth is stunted through insufficient access to water and foodstuffs, the vascular bundles being notably reduced in comparison with those of the long stamens. The stigma papillae, however, are much the same in the pistils of different lengths, though it has generally been thought otherwise. The phenomena of stunted growth in heterostyled flowers has much in common with stunting in cleistogamous flowers, though in the one case it favors cross pollination, and in the other, close pollination. Thus there is not an adaptaton of pollen grains to particular stigmas. Self-sterility would seem to rest on factors of chemical nature. See also rev. by RENNER in Zeitschr. Bot. 10: 767-768. 1918.—H. C. Cowles.

268. TURCHINI, Jean. Rôle de l'hétérocyste des Nostocées. [Rôle of the heterocyst of the Nostocaceae]. Rev. Gén. Bot. 30: 273-282. Pl. 19. 1918.—See Bot. Absts. 1, Entry 1321.

269. TURESON, GÖTE. Om långvaga växttransport genomfoglar. [Distant transportation of plants by means of birds.] [Swedish.] Bot. Notiser 1918: 248. 1918.—As examples of plants transported long distances by birds are given *Carex festiva* and *Fragaria chilensis*, carried from Alaska to the Sandwich Islands. A similar case is noted in the hepatic *Lepidozia sandwicensis*, found in the same two territories. It is uncertain to which of the two it is really indigenous.—P. A. Rydberg.

270. VON KIRCHNER, O. Die Bestäubungseinrichtung von *Isnardia palustris* L. und ihrer Verwandten. [The mechanism for pollination of *Isnardia palustris* L. and related genera.] Flora 11-12: 317-326. 6 fig. 1918.—During the summer of 1917, in the botanical gardens of Munich, the author made careful studies of floral structure and pollination in *Isnardia palustris*, and also in some species of the closely related genus *Ludwigia*. In the flowers of the former he finds complete absence of petals, abundant nectar secretion, and the occurrence of self-pollination which takes place cleistogamously before the opening of the calyx. From a comparison of these facts with those obtained from his studies of various species of *Ludwigia*, especially *Ludwigia repens*, the author concludes that the first step in the gradual development of cleistogamy proper in *Isnardia palustris* is regular autogamy, and the second, the degeneration of the corolla.—P. D. Strausbaugh.

271. WATERMAN, W. G. Development of root systems under dune conditions. Bot. Gaz. 68: 22-53. 17 fig. July, 1919.—The study is made in the neighborhood of Crystal Lake, Benzie County, Michigan. After a presentation of the synecology of the region, the author notes that little study has been made of the extension of root systems, or of the reasons therefor. On account of its relative uniformity dune sand is regarded as particularly well-suited for such a study. Striking differences in root reactions are found in species of the same habitat, even in such a pioneer habitat as the foredune; for example *Ammophila* has great root extension in pure dune sand, whereas *Prunus pumila* has similar extension only where the roots come in contact with organic matter. Such reactions are specific and hereditary, and are of much importance in the determination of species for dune planting. Chemical influences are probably more important than moisture, oxygen, or soil penetrability in the causation of asymmetry in root development. The frequent lengthening and thickening of roots at the expense of shoots, where the roots come into favorable relation with organic matter, calls into question the value of the common method of estimating plant growth by measuring the length and weight of roots.—H. C. Cowles.

272. WEAVER, J. E. The quadrat method of teaching ecology. Plant World 21: 267-283. Fig. 1-7. 1918.—See Bot. Absts. 4, Entry 165.

273. YOSHII, Y. [Rev. of: HAYDEN, ADA. The ecologic subterranean anatomy of some plants of a prairie province in central Iowa. Amer. Jour. Bot. 6: 87-105. 14 pl. 1919. (See Bot. Absts. 2, Entry 745; 4, Entry 227.)] Bot. Mag. Tokyo 33: 111-112. 1919.

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274. ARMITAGE, ELEANORA. On the habitats and frequencies of some Madeira bryophytes. Jour. Ecol. 6: 220-225. 1918.—A brief account of the bryophyte communities at various elevations on the southern side of the island of Madeira. About 170 species are listed as characteristic of various habitats.—G. E. Nichols.

275. ARRHENIUS, OLOF. Försök till en ny metod för analys av växtsamhällen. [Experiments relating to a new method of analyzing plant associations.] Svensk. Bot. Tidskr. [Stockholm] 13: 1-20. 1919.—The author describes and illustrates a method which he has worked out for quickly analyzing plant associations. He has used it in about one hundred cases with good results, though he considers it still in the experimental stage. Its chief value is its ready adaptability to field use.—W. W. Gilbert.

276. BEAUVERD, GUSTAVE. Excursions phytogéographiques aux environs de Viège et Zermatt (Valais). [Phytogeographic excursions to the vicinity of Viège and Zermatt (Switzerland).] Bull. Soc. Bot. Genève 10: 259-284. 1918.—A comparative study of the spring subalpine flora in the vicinity of Zermatt leads to an ecological classification in which the flora may be considered as represented by three phases. The first flowering plants to dominate the artificial prairies are: *Trollius europæus*, *Melandrium roseum*, *Geranium silvaticum*, and *Narcissus poeticus* which was possibly introduced. In the scrub, *Juniperus sabina* is accompanied by different species of *Artemisia*, *Achillea*, *Astragalus* and *Oxytropis*. *Juniperus commune*, *Prunus mahaleb*, and *Berberis vulgaris* are generally frequent. The lower forests consist mainly of pine, spruce, birch and larch with *Crataegus*, a little *Quercus* and *Acer campestre*. *Pinus montana*, *Betula pubescens*, *Picea excelsa*, and *Larix decidua* make up the middle forests fringed with *Pinus cembra*, *Alnus viridis*, and sometimes different species of *Salix*. With the disappearance of *Pinus montana* and *Picea excelsa* the upper forests are characterized by a pure formations of firs.—W. H. Emig.

277. BEWS, J. W. The grasses and grasslands of South Africa. VI + 161 p. 24 fig. P. Davis & Sons, Ltd.: Pietermaritzburg, 1918.—See Bot. Absts. 2, Entry 7; 3, Entry 1287. Also Nature 103: 62. Rev. by FULLER in Bot. Gaz. 67: 370, and by W. G. SMITH in Jour. Ecol. 7: 84-87.

278. BOUGET, JOSEPH. De l'influence des neiges sur la répartition des différents végétaux à même altitude dans les zones élevées des Pyrénées. [The influence of snow on the distribution of different plants at the same altitude in the elevated zones of the Pyrenees.] Rev. Gén. Bot. 30: 305-320. Oct., 1918. The author discusses some facts concerning plant distribution on the north slope of the central Pyrenees, on the basis of observations made during a period of twenty-five years. Three levels are chosen in order to facilitate presentation: one at 1900, a second at 2500, and a third at 2800 meters. Lists of the plants found in places of more marked relief, and those growing in depressions at these respective altitudes are given. An attempt is made to account for this grouping of the vegetation, each group presenting its own peculiar floral composition. Reference is also made to the practical application of the facts observed in the problem of reforestation. Conclusions are as follows: "(1) the distribution of plants in the elevated places of the mountains is strongly influenced by the relief of the surface and by the length of time it is covered with snow. At a given altitude, with a given exposure, and upon soil of the same nature, the vegetation is xerophilous upon the ridges with some woody and herbaceous plants; while it is essentially hygrophilous in the low places with plants exclusively herbaceous. Between these extreme cases there exists an intermediate vegetation the nature of which is in direct accord with the contour of the land. (2) The exclusively herbaceous flora of the depressions where the snow remains for a long time is composed of a curious mixture of alpine and lowland plants, all however hydrophilous. (3) The upper limits of the forests are directly determined by these influences, that is by the relief of the soil. The trees always occur at a higher altitude on the ridges than in the low places. *Abies pectinata*, for example, never ascends above 1800 meters except upon the

ridges. The limit of the continuous forest for this species is then about 1800 meters, and not above. (4) As a practical consequence it is absolutely useless to attempt to reestablish the first forest above 1800 meters upon the north slope of the Pyrenees."—*P. D. Strausbaugh*.

279. BRENCHLEY, W. E. **Buried weed seeds.** Jour. Agric. Sci. 9: 1-31. 1918.—A study of the viability of weed seeds, also showing that the weed flora of any given tract of land is closely associated with the recent history of that land; in other words, the origin of such weed seeds is largely local. [See Bot. Absts. 2, Entry 615.]—*H. C. Cowles*.

280. BURKILL, I. H. **The composition of a piece of well-drained Singapore secondary jungle thirty years old.** Gardens' Bull. Straits Settlements 2: 145-157. 1919.—An area of about two acres was cleared in a secondary jungle in the "rain forest" of "Malaya." An attempt was made to determine the relative abundance of every species present; height and girth measurements were made of trees above thirty feet in height.—*S. F. Trelease*.

281. COKER, W. C. **A visit to Smith Island [North Carolina].** Jour. Elisha Mitchell Sci. Soc. 34: 150-153. Pl. 10-16. Sept., 1918.—Smith's Island is the southernmost point on the North Carolina coast, at the mouth of the Cape Fear River, and is the northernmost locality where *Sabal Palmetto* occurs in any abundance. There are said to be several thousand individuals of this palm there, but a great many were killed by the extreme cold of the winter of 1917-18. The vegetation has a semi-tropical aspect, and the great majority of the trees are evergreen. The paper closes with notes on and two illustrations of *Dendrium buxifolium*, a rare Ericaceous shrub found on the mainland near by.—*Roland M. Harper*.

282. FARROW, E. PICKWORTH. **On the ecology of the vegetation of Breckland. VII. General effect of blowing sand upon the vegetation.** Jour. Ecol. 7: 55-64. 1 pl. May, 1919.—Continuing the series already noted (See Bot. Absts. 1, Entry 824) the author reports the details of the manner of sand movement upon a sandy heath, the development of miniature sand blasted cliffs and the unearthing of *Calluna* plants receiving special attention. In the revegetation of bare sand blasted areas *Polytrichum piliferum* was a common pioneer followed by *Cetraria aculeata*, *Cladonia coccifera* and *Ceratodon purpureus*. In an experimental quadrat of bare sand *Rumex acetosella* was the chief pioneer soon accompanied by *Senecio vulgaris*, *Cladonia* spp., *Taraxacum erythrospermum* and *Galium saxatile*, the divergence in the experimental quadrat from the ordinary succession being ascribed to the fact that it was protected from rabbits. The reaction of plants to covering with drifted sand was also noted and *Agrostis vulgaris*, *Festuca ovina*, *F. rubra*, *Galium verum*, *Rumex acetosella*, *Thymus serpyllum* and *Lotus corniculatus* were found to be successful in surmounting superficial deposits of sand.—*Geo. D. Fuller*.

283. FERNALD, M. L. **Lithological factors limiting the ranges of *Pinus Banksiana* and *Thuja occidentalis*.** Rhodora 21: 41-67. 1 fig. Mar., 1919.—A criticism of a recent ecological paper by Hutchinson (HUTCHINSON, A. H. **Limiting factors in relation to specific ranges of tolerance of forest trees.** Bot. Gaz. 66: 465-493. 7 fig. Dec., 1918. [See Bot. Absts. 4, Entry 190]), especially with regard to what the latter describes as the "anomalous" distribution of *Thuja occidentalis*, and the "irregularities" and "inconsistencies" in the distribution of *Pinus Banksiana*. The present author claims that *Pinus Banksiana* is calciphobous, being found on acid rocks and sands and sometimes in acid bogs. *Thuja occidentalis*, on the other hand, is calcicolous, being confined mainly to basic soils, all of its outlying stations being in positively calcareous areas. The presence of *Thuja* in cedar swamps is explained by regarding these habitats as rich in calcium and potassium and so comparable to the "low moors" of Europe. Rev. by Fuller in Bot. Gaz. 68: 149-150. 1919.—*James P. Poole*.

284. FOWERAKER, C. E. [Rev. of: OLIVER, W. R. B. **The vegetation of Lord Howe Island.** Trans. New Zealand Inst. 49: 94-161. 7 pl. 1916.] Jour. Ecol. 7: 106-108. 1919.

285. FRÖDIN, JOHN. Om förhållandet mellan berggrundens kalk-halt och de nordswenska växternas utbredning [The relation between the lime content of the underlying rocks and the distribution on the North Swedish species of plants]. [Swedish.] Bot. Notiser 1919: 139-147. 1919.—While it is true in general that certain plants prefer and are practically limited in distribution to localities with underlying calcareous rocks, in many places lime-loving plants occur in regions with underlying siliceous rocks. Especially in valleys calcareous stones and gravel derived from neighboring calcareous formations may overlie the siliceous bed rock. In places where the underlying rocks are calcareous, one may find lime-lovers poorly represented, because of masses of deposited siliceous sand and gravel. There is, therefore, need of being careful and of not placing too much importance on the underlying rocks, as the upper soil, gravel, or loose rocks may have a different content of lime.—P. A. Rydberg.

286. FULLER, GEO. D. Units of vegetation and their classification. Bot. Gaz. 66: 385-388. 1918.—This paper embodies a critical review of some of the more recent articles making contributions to the classification and nomenclature of the units of vegetation recognized by ecologists. Moss is shown to have traced the early history of the subject, GLEASON to have emphasized the individualistic concept in contending that all phenomena of vegetation depend upon the phenomena of the individual plant, while CLEMENTS has gone to the other extreme in regarding the plant community as an organism or at least as directly comparable to an organism. CLEMENTS has also elaborated a complex system of classification of plant communities. NICHOLS is shown to have regarded the association as the fundamental unit of vegetation and to have elaborated a logical classification based upon this unit. He has also added a useful but abstract concept in the *association-type* to represent "a type of plant association which is correlated with a given type of habitat." He is shown to have retained the well known classification of SCHIMPER by modifying the concepts to include the developmental idea, and to have demonstrated the utility of his classification by applying it to the analysis of the vegetation of Cape Breton Island.—Geo. D. Fuller.

287. GANONG, W. F. Nichols's vegetation of northern Cape Breton. [Rev. of: NICHOLS, GEORGE E. The vegetation of northern Cape Breton Island, Nova Scotia. Trans. Conn. Acad. Arts and Sciences 22: 249-467. 1918. See Bot. Absts. 1, Entry 833.] Rhodora 21: 171-172. 1919.—A review of Nichols's monograph.—James P. Poole.

288. HARVEY, LeROY H. A coniferous sand dune in Cape Breton Island [Nova Scotia]. Bot. Gaz. 51: 417-426. 8 fig. May, 1919.—An account of the only dune formation found in this region. Three associations are described: (1) the middle beach; (2) the dune complex; and (3) the salt marsh. The characteristic plants of each of these associations are listed. In summarizing, the author states that "the purpose of the paper is to put on record several facts of ecological interest: (1) a coniferous sand dune with *Picea canadensis* as its facies located at the latitude of 47 degrees north; (2) *Poa compressa* as a sand binder; (3) abundant layering in *Picea canadensis* and *Abies balsamea*; (4) the anomalous condition of a sand dune moving seaward; (5) a phenomenal development of *Arceuthobium pusillum* on *Picea canadensis*; (6) the decisive value of ecological data in the interpretation of physiographic phenomena."—P. D. Strausbaugh.

289. HEPBURN, IVAN P. Ecological notes on the mountainous portions of the Herschel District [South Africa]. South African Jour. Nat. Hist. 1: 210-223. 1919.—The mountains of the Herschel District reach a height of 9000 feet, and the higher strata consist of Drakensberg lavas and basalt. The Cave sandstone strata reach a height of between 600 and 7000 feet, and probably strata of blue and red shale occur between the Cave sandstones. At a lower level the red sandstone occurs. The annual rainfall varies from 23 to 40 inches. The winter is cold. The spring is usually windy and dry and the early summer is often dry; the late summer and autumn is the rainy season. There is no doubt that the influence of man has increased and is still increasing the aridity of the country. This is very evident on the mountains. The veld is mostly grassland but owing to overstocking, etc., the grass is in

many places being replaced by various shrubs. Succulents are very rare. In the mountain formation there is a great difference between the vegetation of sunny and of shady slopes. Often on shady slopes bush and scrub occur. On the mountains there appear to be roughly four formations: (1) *Leucosidea sericea* in the kloofs. (2) The mesophytic *Arundinaria tesselata* formation, (3) The less mesophytic tussock grass formation, and (4) the xerophytic ericoid shrub formation.—*E. P. Phillips.*

290. KIRKCONNEL, T. W. The flora of Kapuskasing [Ontario] and vicinity. Canadian Field-Nat. 33: 33-35. 1919.—A brief description of vegetation under subarctic conditions, in a part of the so-called 'clay belt' of New Ontario.—*W. H. Emig.*

291. KOLKOWITZ, R. Über die Standorte der Salzpflanzen.—II. *Plantago maritima*. [Concerning the distribution of halophytes. II. *Plantago maritima*.] Ber. Deutsch. Bot. Ges. 36: 636-645. 1 fig. 1918. [Mar., 1919].—*Plantago maritima* was observed on soils containing chlorides, sulphates, carbonates and possibly silicates. In the places where it stands outside its normal associations it is derived from forms originally typical halophytes. However, the chief occurrence of *Plantago maritima* is in salt soil with typical salt plants.—*Ernst Artschwager.*

292. LUNDEGARDH, HENRIK. Ekologiska och fysiologiska studier på Hallands Väderö. I. Vegetationens sammansättning [Ecological and physiological studies on Hallands Väderö (an island off the west coast of southern Sweden). I. Composition of the vegetation.] [Swedish.] Map. Bot. Notiser 1918: 265-286. 1918.—The vegetation is divided between the shore-vegetation and the forest. The former is subdivided into the vegetation of the cliff-shores and of the sand-beaches, and the latter into the oak- and beech-woods and the alder-swamps. All except the woods proper show zonations depending upon the depth of the permanent moisture of ground-water, the percent of salt present, and the amount of light. Short descriptions of the vegetation of each zone are given, as well as that of the small islets surrounding Hallands Väderö. These islets have only a cliff-shore vegetation.—*P. A. Rydberg.*

293. MACINTIRE, W. H. The growth of sheep sorrel in calcareous and dolomitic media. Jour. Amer. Soc. Agron. 10: 29-31. 1 pl. Jan., 1918.—It has generally been held that *Rumex acetosella* grows best in an acid soil; hence it has been used as an indicator of acid land. Since there is ample experimental evidence that this plant can thrive in calcareous media, it is probable that its general absence from such soils in nature is due to its relative impotence in competition. [See also Bot. Absts. 2, Entry 311.].—*H. C. Cowles.*

294. MORRIS, GEORGE. Reconnaissance of the plant associations in the neighborhood of Newbury, Berkshire. Jour. Ecol. 7: 65-70. 2 fig. May, 1919.—Notes are given upon an area with varied substratum having a vegetation much disturbed by man's activities and including forests in which *Quercus robur*, *Fagus silvatica*, *Acer pseudo-platanus*, *Betula*, and *Pinus silvestris* are prominent elements. There are also areas of alderwood, *Alnus glutinosa*, and of heaths dominated by *Calluna* and *Ulex*. Some conclusions are drawn as to the probable primitive vegetation.—*Geo. D. Fuller.*

295. NAUMANN, EINAR. Bidrag till kännedomen om vegetationsfärgningar i sötvatten. VII. En komplettering till bidragen II, III och V. [Contribution to the knowledge of vegetable coloration in fresh water]. (Swedish, with German résumé.) Bot. Notiser 1918: 217-230, fig. 1-4. 1918.—The following plankton associations are described and illustrated: (1) *Golenkinia radiata*, (2) *Chrysococcus porifer*, (3) *Chlamydomonas* spp. and *Trachelomonas volvocina*, (4) *Chrysococcus*, *Trachelomonas*, *Euglena*, &c.—*P. A. Rydberg.*

296. PAULSEN, OVE. Plankton and other biological investigations in the sea around the Faeroes in 1913. Meddelelser Fra Kommissionen For Havundersøgelser, Serie; Plankton. I. 27 p., fig. 6. 1918.—An account of plankton investigations made in Trangisvaag fjord and on Faeroe Bank from May 15 to June 21 of the summer of 1913. The dominant species are listed and attention is given to the density of the plankton, composition and distribution.

The *Laminaria* forests are described, and a list of the diatom species collected is included. Examinations of the stomach content of the fish found in the fjord reveal that "the cod and coalfish both live on plankton organisms and bottom forms, as well as on animals living in the weed beds, with this difference, however, that the coalfish feeds to a greater extent than the cod on plankton, while gammarines appear to form the staple nourishment of the young cod.—P. D. Strausbaugh.

297. PAVILLARD, J. *Remarques sur la nomenclature phytogéographique.* [Remarks on phytogeographic nomenclature.] 27 p. Roumégous et Déhan: Montpellier, July, 1919.—This article consists principally of a discussion of the application of the terms habitat (station) life-forms and association and of the proper content of the concepts associated with these terms. This discussion includes a criticism of the recent articles by Gams, Du Rietz and Braun-Blanquet on ecological terminology. To avoid confusion Pavillard suggests that "locality" should be used when a purely geographical meaning is intended and that "habitat" have an entirely ecological significance. He also insists upon the characterization of the association by its floristic composition but recognizes that there should be more than the mere enumeration of the species present. To provide this further analysis he approves of giving to each species a number indicative of its constancy in the association under consideration. This numerical evaluation has been termed a "coefficient of affiliation" (*Gesellschaftstreue*) by Braun-Blanquet. To this Pavillard adds another coefficient of similar numerical rank, that is ranging from 5 to 0, termed a "genetic coefficient" and based upon the importance of the species in the development and maintenance of the association. The combined value of these coefficients will tend to express with some accuracy the true value of each species of a community. Rev. by Fuller in Bot. Gaz. 69: 184. 1920.—Geo. D. Fuller.

298. PHILLIPS, EDWIN PERCY. *Some notes on a collecting trip to French Hoek.* South African Jour. Sci. 15: 450-478. 1919.—French Hoek lies at an altitude of 836 feet and is surrounded by a chain of mountains roughly in the form of a horse shoe. Above 1500 feet is Table Mountain Sandstone which rests on the Malmesbury beds and the valley is covered with Recent deposits. The character of the vegetation changes as the mountains are ascended. The slopes are covered with bush and shrub, principally *Cliffortia ruscifolia* and *Passerina filiformis*. On the Sandstone the bush disappears and the summits are clothed with species of *Restiaceae*. The Table Sandstone carries a more varied flora than the Malmesbury beds, and each formation has some species restricted to it. The bulk of the species are either woody shrubs, bushes or trees; herbaceous plants, acaulescent plants, prostrate plants or scramblers and annuals are not so numerous. The bulk of the species have simple, glabrous leaves, and the xerophytic characters are mainly evidenced in the reduced leaf, involute or revolute leaf and leaves with thick cuticles. Over 60 per cent of the species produce conspicuous flowers, or flowers grouped into conspicuous masses. The color of the flowers is usually white or yellow. Dehiscent fruits predominate, then follow dry indehiscent fruits, while fleshy fruits are rare. There follows a list of 335 species collected, accompanied by field notes.—E. P. Phillips.

299. PHILLIPS, EDWIN PERCY. *A note on the flora of the great Winterhoek Range* [South Africa]. South African Jour. Sci. 15: 226-234. 1918.—The altitude of Winterhoek Peak is 6,818 feet, and the character of the vegetation together with the various species encountered is noted for different levels throughout this range of altitude. Author believes "it is exposure which determines the altitude at which the mountain flora begins, and this may be as low as 3000 feet or as high as 5000 to 6000 feet." Following the classification of Raunkiaer, "nearly 60 per cent of the species are prostrate plants with winter buds below the surface of the soil, or a few inches above the ground-level (hemicyrptophytes and chamaephytes), while the bushes (nanophanerophytes) constitute only 15.10 per cent of the flora. If the geophytes and therophytes, as a general class, are included with the hemicyrptophytes and chamaephytes as representing a type adapted for tiding over adverse climatic conditions, we then find that 79.16 per cent of the flora of the Winterhoek and environs is of this extremely xerophytic type." Attention is also given to the various leaf characters represented, size and color of flowers and types of fruit.—P. D. Strausbaugh.

300. POLE EVANS, I. B. The plant geography of South Africa. Official Year Book Union of South Africa 2: 51-58. 1919.—This is a reprint of the paper in the Year Book for 1918. [See Bot. Absts. 1, Entry 468.]

301. RAUNKIAER, C. Recherches statistiques sur les formations végétales. [Statistical investigations on plant formations.] Kgl. Dansk. Vidensk. Selskab. Biol. Meddel. 1: 80 p. 3 fig. 25 tables. 1918.—The author has here summarized the material of his former contributions and shown something of their applications to the solution of problems of ecological plant geography. His statistical or valence method consists in analyzing a plant population by means of the scrutiny of certain unit areas of 0.1 sq. m. outlined by a metal radius of suitable length attached to a walking stick. From the examination of 25 to 50 such areas the frequency with which a given species occurs is determined and is expressed as a frequency percentage, frequency coefficient or valence. He defines his "formation" as a plant community that is homogeneous from a floristic point of view with respect to the species showing the highest frequency coefficients. In areas that have been relatively undisturbed he believes that an equilibrium will be reached and he formulates a law relative to the occurrence of species within such a community. "In a formation in a state of equilibrium one or more species will prosper at the expense of their neighbors because such dominant species are better adapted to live under the conditions existing within the formation of which they are a part, and by their aggregation they will prevent other species from equalling them in frequency. But however well they may be equipped for such community life they cannot prevent other species, widely disseminated but fewer in individuals, from entering the formation and there occupying portions that for any reason may have been left bare of the dominant species. It follows that there is a much larger number of the less frequent species."—A similar method for determining the relative area occupied by each species is described and a classification of vegetation on the basis of life-forms and leaf-sizes given. [See also Bot. Absts. 4, Entry 198. Also Jour. Roy. Microsc. Soc. 1919: 52-53. Also Nature 103: 33. Also rev. by Moreau, Bull. Soc. Bot. France 66: 58-59.]—*Geo. D. Fuller.*

302. SCHRÖDER, BRUNO. Die Vegetationsverhältnisse der Schwebepflanzen in Schlawasee [Silesia]. [Vegetational relations of the plankton of the Schlava Lake.] Ber. Deutsch. Bot. Ges. 36: 648-659. 2 fig. 1918.—A seasonal study of the plankton shows that the greatest number of species is found during the summer, the smallest number, a little more than one-third, during the winter season. The schizophytes, chlorophytes and phaeophytes appear throughout the year, the conjugatae primarily during the summer. *Cladophora* is present the year around. Temporary variations are observed. In the case of *Ceratium hirundinella*, however, the individuals remain unaltered as regards form and size.—*Ernst Artschwager.*

303. SHREVE, FORREST. Vegetation of southern South America. [Rev. of: SKOTTSBERG, CARL. Botanische Ergebnisse der swedischen Expedition nach Patagonien und dem Feuerlande 1907-1909. V. Die Vegetations-verhältnisse längs der Cordillera de los Andes S. von 41° S. br. [Botanical results of Swedish Expedition to Patagonia and Tierra del Fuego, 1907-1909.—V. Vegetation of the Andes south of 41° south latitude.] Kungl. Svensk. Vet. Handl. 56: 1-366. Pl. 23. 1916.] Plant World 22: 55-56. 1919.

304. SIM, T. R. Soil erosion and conservation. South African Jour. Indust. 2: 715-724. 1919.—Vegetation is a preservative covering. It is protective against insolation, drought, radiation, wind, flood, and donga formation. The vegetation has an effect on the atmosphere and conversely the atmosphere has an effect on the vegetation. Concentration of water should always be prevented, if possible, but in the lower grades of plant succession, especially where close turf and humus are absent, such concentration is exceedingly dangerous and leads directly to all serious cases of donga formation, erosion of cultivated land and river erosion.—*E. P. Phillips.*

305. SMITH, W. G. [Rev. of: BEWS, J. W. The grasses and grasslands of South Africa. 191 p. Map. 24 fig. Davis & Sons: Pietermaritzburg. 1918. [See Bot. Absts. 2, Entry 7; 3, Entry 1287.] Jour. Ecol. 7: 84-87. 1919.

306. TAYLOR, ARAVILLA. Mosses as formers of tufa and of floating islands. Bryologist 22: 38-39. 1919.—In certain chalybeate springs *Brachythecium rivulare* B. & S., assists in the formation of a hard, porous tufa, like that formed by *Cratoneuron filicinum* in calcareous springs. Near the head of Lake Michigan *Campyllum stellatum* (L.) Bryhn is one of the chief agents in the formation of surface mats and floating islands in the lagoon ponds and "pannes." —Edward B. Chamberlain.

307. TULLSEN, N. The haunts of a naturalist. Amer. Bot. 25: 137-144. 1919.—A popular account of the vegetation in Knox County, Illinois.—W. N. Clute.

308. TURRILL, W. B. Contributions to the flora of Macedonia: I. Kew Bull. Misc. Sup. [London] 1918: 249-341. 1918.—The Macedonian flora between Salonika and the Struma Plain and Krusa Balkan is considered ecologically under three divisions: hill and foothills floras, nullah flora, and plain flora. The most striking plant of the hills, which nowhere reach above 1000 meters, is the Kermes oak, *Quercus coccifera*; this oak constitutes a distinct shrub formation, suggestive of the maqui. Amongst the oaks is an abundant annual flora. The nullahs are gorges or ravines, cut in the solid rock of the hills or in the diluvium of the foothills or plains; by reason of moisture and protection from the sun, they maintain an abundant vegetation through the heat of summer. The plains have the best agricultural lands, and these show a rich weed flora, especially since their abandonment during the war. Notes follow, dealing with seasonal succession and floristic affinity. [See Bot. Absts. 2, Entry 4, Entry 368. Abs. Nature 102: 395.]—H. C. Cowles.

309. WATSON, W. The bryophytes and lichens of calcareous soil. Jour. Ecol. 6: 189-198. 1918.—A comparative study of the bryophyte and lichen flora of various calcareous substrata. The areas treated include the chalk, the older limestones with ash woods, exposed limestone rocks, limestone grasslands, and limestone pavements. The conclusion is reached that, while there may be some doubt as to the relative importance of physical and chemical soil factors in so far as these influence the distribution of the higher plants, in regard to many bryophytes and lichens there is little question that chemical factors are the more important. Detailed lists of species are given. See also Jour. Roy. Microsc. Soc. 1919: 74.—G. E. Nichols.

310. WATSON, W. The bryophytes and lichens of fresh water. Jour. Ecol. 7: 71-83. 1919.—A comprehensive summary of the bryophyte and lichen flora characteristic of different types of freshwater habitat in Britain, with detailed lists, incidental attention being given to seed-plants and algae. Four principal groups are distinguished: the "subformations" (1) of foul waters, (2) of slowly moving waters relatively rich in mineral salts, (3) of slowly moving waters relatively poor in mineral salts, (4) of quickly flowing streams. These are variously subdivided. Bryophytes and lichens are absent in foul waters; they are most abundantly represented along quickly flowing streams, upwards of 250 bryophytes and nearly 50 lichens being listed as characteristic of the fourth subformation. Attention is called, among other things, to various structural peculiarities exhibited by species growing in the different types of habitat, and to their distribution with reference to the calcareousness of the water.—G. E. Nichols.

FLORISTICS

311. ALM, CARL G. Bidrag till södra Norrbottens flora. [Contribution to the flora of south Norrbotten (Sweden).] Svensk. Bot. Tidskr. [Stockholm] 13: 102-104. 1919.—A list of 78 plants with the localities where each was found.—W. W. Gilbert.

312. ALVAREZ, O. P. Descripción geográfica de la Isla de Formosa. [Descriptive geography of Formosa.] [Chapter III. Botany.] Bol. R. Soc. Geogr. Madrid 60: 445-499. 1918.—Chapter III of this work is devoted to a general treatment of the flora of Formosa, taking up first a history of published work, principally that of HAYATA, MATSUMURA, and KAWAKAMI, then giving a partial enumeration of the plants, particularly the economic species. Fragoso in review notes that it is a curious work without scientific pretensions but worth reading. Through abst. by FRAOOSO, R. Gz. in Bol. R. Soc. Española Hist. Nat. 19: 288. 1919.

313. ANDREWS, A. LE ROY. *Dicranoweisia crispula* in the White Mountains. *Rhodora* 21: 207-208. Nov., 1919.—An account of a station established for this moss in 1917 by the Cold Brook of King's Ravine in the White Mountains of New Hampshire. Also gives the record of other stations at which the species is known to occur.—James P. Poole.

314. ANONYMOUS. Resistant chestnut. *Amer. Bot.* 25: 25. 1919.—The suggestion is made that many plants may have become extinct through the attacks of microscopic organisms rather than through changes of climate, as usually stated.—W. N. Clute.

315. BEAUVERD, GUSTAVE. Esquisse synécologique comparative de deux marais des environs de Baulmes. [A synécological comparison of two marshes in the vicinity of Baulmes.] *Bull. Soc. Vaudoise Sci. Nat.* 52: 17-93. 1918.—A study of two marshes, the Marais de Rances and the Marais de la Baumine, on the mid-slopes of the Jura Mountains, in Canton Vaud, Switzerland. Though having the same altitude and subsoil, the two marshes have notable floristic differences. The Marais de Rances has a disjunct lowland element, represented by *Gentiana baltica* and *Phyteuma tenerum*. There are also tree relicts, attesting to a former forest condition. The Baumine plants are of mountain affinities, the plants being largely typical of subalpine pastures, such as those of the headwaters of the Baumine stream. [See Bot. Absts. 1, Entry 795.]—H. C. Cowles.

316. BENNETT, ARTHUR. *Vaccinium intermedium* Ruthe. *Jour. Botany* 57: 284-285. 1919.—A note on the occurrence of this plant in England. It was called forth by a paper in the preceding number of *Jour. Botany* (p. 259).—K. M. Wiegand.

317. BENNETT, ARTHUR. *Carex montana* L. and *Calamagrostis stricta* Timm. *Jour. Botany* 57: 322-323. 1919.—Notes on occurrence of this plant in Great Britain.

318. BICKNELL, EUGENE P. The ferns and flowering plants of Nantucket—XX. *Bull. Torrey Bot. Club* 46: 423-440. 1919.—This article forms the conclusion of the series on Nantucket. In this catalogue have been listed 1136 species including 33 natural hybrids. A general discussion is given of the affinities of the flora, a list is made of species with their northern or eastern limit on the island, and one, of the northern species reaching their southern limit here or on Long Island. The number of introduced species is also discussed.—P. A. Munz.

319. CAMPBELL, DOUGLAS HOUGHTON. The derivation of the flora of Hawaii. Leland Stanford Junior Univ. Publ. Univ. Ser. 34 p. 1919.—The generally accepted view as to the origin of the Hawaiian Islands, which are entirely volcanic, holds that they were thrown up from the ocean depths and always have been isolated; but another view, which the author accepts as the most satisfactory explanation of the origin of the flora, holds that Polynesia, including the Hawaiian Islands, is the remains of a once extensive land mass, either a single continent or several large continental islands.—“Some such connection seems necessary to explain the great preponderance of Australasian and Malayan types in the flora, especially such forms as offer no ready means of transport by any known agency.” Fifty-one genera of spermatophytes and 37 species of pteridophytes occur in Hawaii which are common to the Australasian-Malayan region, but not found in America, while only 6 Hawaiian-American genera of spermatophytes and two species of pteridophytes are found in Hawaii and not in the Australasian-Malayan region. “The great preponderance of Indo-Malayan elements in the

Hawaiian flora is sufficiently evident. Not only is the number of extra-American genera common to the two regions very large, but a majority of the endemic genera are evidently derived from southern Pacific or Asiatic types."—The American elements are of two kinds: first, those which have been introduced since the isolation of the islands, mostly from the west coast of North America, through the agency of wind or of migratory birds; and, second, certain genera allied to South American types which very possibly may be residual forms from an era when there was a connection between South America through some extensive Antarctic continent with New Zealand."—An objection to the continental theory has been the absence of Coniferae, especially such southern types as *Araucaria*, *Podocarpus* and *Agathis*, and other old types which are abundant in the Australasian-Malayan region. "The probable explanation is the possibility of the extinction of these forms after the isolation of the islands. There are plenty of examples of such disappearances of plants from regions which they once inhabited." These extinctions may have been brought about by various causes such as diseases and climatic changes. "The almost complete absence of granitic or calcareous soils, for example, would practically prohibit the growth of many species that might very well have been present at an earlier period before the submergence of areas now completely covered by volcanic formations." Detailed accounts of the animals give strikingly similar results; especially is this true among the molluscs, insects, arachnida, marine invertebrates, and fishes. [See also Bot. Absts. 1, Entry 822; 3, Entry 1608; also Plant World 22: 57. 1919.]—*Le Roy Abrams*.

320. CHEESEMAN, T. F. The vascular flora of Macquarie Island. Sci. Rept. Australian Antarctic Expedition of 1911-14. C7: 63 p. Pl. 3. Map. 1919.—Lying 600 miles south-west of the Island of New Zealand, 920 miles south-east of Tasmania and 970 miles from the Antarctic continent, the position of Macquarie Island is one of great isolation. It is little more than a short range of mountains with peaks ranging from 900 to 1424 feet in height, the length of the island being 21 miles and its breadth less than 4 miles. The hills descend rapidly towards the sea forming bold headlands and precipitous cliffs with no harbors or sheltered bays. It possesses a remarkably equable temperature, the mean maximum being 43°.5F. and the mean minimum 37°.9F. while the extreme range is only 24°.8F. A rainfall of 45 inches is distributed so that no month has less than 3 inches. Wind velocity is uniformly great, averaging 18 miles per hour. It has an impoverished vascular flora of 30 seed plants, 3 ferns and 1 lycopod. Concerning the origin and affinities of this flora Cheeseman decides that with the exception of three endemic grasses it dates no further back than the last glacial epoch. The repopulation was probably effected through the agency of birds as half its plant species are common to New Zealand, 15 are found also in Fuegia or South Georgia, and a like number are circumpolar.—The vegetation is characterized by the entire absence of trees and shrubs. The conspicuous plant forms are the tussock grasses, principally *Poa foliosa*, the large leaved "Macquarie Island cabbage," an araliaceous plant resembling a fine rhubarb, the cushions of the umbelliferous *Azorella Selago*, globular masses often four feet across, and a purple composite, *Pleurophyllum Hookeri*, with long sage-green leaves. The tussock grass is by far the most important of these forms occupying much of the mountain slopes. Rev. by Fuller in: Bot. Gaz. 69: 95. 1920. Other reviews in: Nature 104: 101. 1919. Jour. Botany 57: 262. 1919. Plant World 22: 184. 1919.—*Geo. D. Fuller*.

321. CLUTE, WILLARD N. A trip to Navajo Mountain. Amer. Bot. 25: 81-87. Pl. 1. 1919.—Navajo Mountain on the borders of Arizona and Utah has never been visited by botanists. The surrounding desert has few species of flowering plants, but the mountain above 7000 feet had a conspicuous summer flora consisting of eriogonums, pentstemons, lupines, evening primroses, painted cups, and golden-rods. A full list of the species is to be published later.—*W. N. Clute*.

322. COVILLE, F. V. The threatened extinction of the box huckleberry, *Gaylussacia brachycera*. Science 50: 30-34. July, 1919.—As the title indicates, the article is designed to call attention to the fact that the Box Huckleberry is in danger of extinction; at the present time the only localities in which the plant is known to exist are in Perry County, Pennsylvania,

and in Sussex County, Delaware. In Pennsylvania the plant is confined to a single patch 400 yards in length, and in Delaware, the plant covers an area only about 8 feet square. The author suggests that these plants may have been originally chance seedlings from seeds carried by birds. In spite of careful search no evidence of seedlings was found, and the author advances the theory that the patch in either case has originated from a single plant; in this case the plant is more than one thousand years old, judging from the length of the root-stock increment. If the patch consists of one plant, that plant may be partially or completely sterile to its own pollen, hence the absence of seedlings. Portions of the Pennsylvania and Delaware plants have been brought together at Washington, cross pollinations have been made, and fruit has set, but the fruit is not mature at the time of writing.—A. H. Chivers.

323. DARLINGTON, HENRY T. Weed immigration into Michigan. Michigan Acad. Sci. Ann. Rept. 20: 261-267. 1 fig. 1918. The data given cover a period of approximately 75 years (1839-1913). Of the 119 weeds listed for the state, 100 were introduced during this time. The climax of immigration occurred during the 23 years from 1881 to 1904 when 41 weeds were introduced. The author correlates this with the increase in number of wagon-roads and railroads that came about at this time with the more rapid settling of the state. A list of weeds is given, together with a statement of percentages introduced from the various different sources.—P. D. Strausbaugh.

324. DE VRIES, HUGO. Das Wandern der Pflanzen. [The migration of plants.] Naturwissenschaften 7: 81-89. 1919.—A critical survey is given of that group of causes of geographical distribution which has to do with the outer factors of existence which may cause changes in the species and may permit a rapid or slow migration of the plants. De Vries leaves out of consideration in this article a group of inner causes of distribution which has to do with the change of species and the development of new species from those already existing. In general, the youngest species live where they originated while the oldest plant species are those with the widest distribution. (DE CANDOLLE found 90 per cent of all plant species to be confined to single districts and, therefore, to have migrated but little from the area of their origin.) The classical examples of plant migration are the exceptions. The best studied cases are those which have followed the wake of man and De Vries confines himself more or less to a study of these cases. He refutes the opinion that migration itself is a cause of the change of species and a factor in the origin of new species. From a study of the distribution of such plants and the conditions of their environment, as *Larrea tridentata*, *Polygonum amphibium*, *Elodea canadensis*, *Salsola Kali*, as well as a few fungi, he reaches the following conclusions: (a) the species character of the migrating plants, as a rule, remains unchanged in new environments; (b) during periods of migration many new species may be found, but such new species show no direct relation to the environment; (c) most of the diagnostic species characters are useless characters as far as the "struggle for existence" is concerned; (d) the many cases of adaptation in nature are due to generic characteristics which originated in earlier geologic periods, of whose climate, etc., we know too little to venture a judgment as to the value of these generic characters to the plant under the conditions of those times; and (e) the facts speak against an origin of new characters through adaptation but rather teach that these are inherited independently of adaptation.—Orton L. Clark.

325. DODGE, C. K. Contributions to the botany of Michigan. Univ. Michigan Mus. Zool. Misc. Publ. 4: 1-14. 1918.—A record of species of vascular plants not previously recorded for Michigan, as well as extensions of range for a number of plants known only from limited portions of the state. These records are based almost entirely upon collections made by the author.—E. A. Bessey.

326. DODGE, C. K. Contributions to the botany of Michigan. II. Observations on the flowering plants, ferns, and fern allies growing wild in Marquette County, Michigan, in 1916 and 1917, especially in the vicinity of the Huron Mountain Club. Univ. Michigan Mus. Zool. Misc. Publ. 5. 44 p. With map. 1918.—The paper is the result of two seasons of collecting by the author, particularly in the Huron Mountain part of Marquette County, together with a study of collections made by others in the same county. The manuscript was completed just before the death of the author. [See Bot. Absts. 3, Entry 1289].—E. A. Bessey.

327. DOMIN, K. Dritte Dekade neuer Adventivpflanzen aus Böhmen. [Third decade of new adventive plants from Bohemia.] Oesterreich. Bot. Zeitschr. 67: 264-267. 1918.

328. DUFRENOY, J. Diversité écologique et coefficients génériques. [Ecological difference and generic coefficients.] Bull. Trimest. Soc. Mycolog. France 35: 27-46. 1919.—The author states that the number of genera and the number of species of parasitic fungi within a certain region depends upon ecological conditions. In order to show this, the author selected (1) a region having great ecological variations (the Valley of Barèges) and (2) several places of more or less uniform character (a grain field, sand hills near the ocean, etc.). In the first mentioned region he observed 11 genera of rusts represented by 52 species, 26 genera of other fungi represented by 40 species, and 3 genera of parasitic bacteria represented by 7 species, giving the following generic coefficients: rusts = 20 per cent, fungi in general = 40 per cent. On the other hand in places of small ecological difference the author found in one place 8 genera of fungi represented by 10 species = 80 per cent. In other places he found 3 genera represented by 3 species = 100 per cent; 10 genera represented by 11 species = 90 per cent; and 11 genera represented by 12 species = 90 per cent. This shows that generic coefficients among parasitic cryptogams as well as among phanerogams depend upon ecological differences.—*Fred C. Werkenthin.*

329. FERNALD, M. L., R. C. BEAN, AND C. H. KNOWLTON. Field trips of the New England Botanical Club, 1919. *Rhodora* 21: 143. 1919.—A report, by the Committee on Field Excursions, of the field trip of the club, May 29-31, into the Berkshire region with a center at Pittsfield, Mass. Typical sections of nine townships were explored and about 500 specimens were collected; many of them were previously known from only one or two stations in the state, among them *Salix serissima* conspicuously in flower. At least eight plants new to the state were collected. Plans for a Labor Day trip to the ponds and bogs of western Rhode Island and adjacent eastern Connecticut are also discussed.—*James P. Poole.*

330. FERRIS, ROXANA STINCHFIELD. A new plant record for California. Bull. Southern California Acad. Sci. 18: 13. 1919.—*Holacantha emoryi* is recorded from California.—*L. R. Abrams.*

331. FLYNN, (MRS.) NELLIE F. Field meeting of the Vermont Botanical Club. *Rhodora* 21: 191-192. Oct., 1919. A short account of the annual field meeting of the club at North Hero on Lake Champlain, August 5-6, 1919. Followed by similar accounts of the meetings of 1917 and 1918.—*James P. Poole.*

332. FRÖDIN, JOHN. Några växtlokaler mellan Kebnekaise och norska gränsen [Some plant-localities between Kebnekaise [a mountain in northern Sweden, lat. 67° N.] and the Norwegian boundary]. Bot. Notiser 1918: 211-213. 1918. The localities of 62 arctic-alpine species are given.—*P. A. Rydberg.*

333. GARLAND, L. V. LESTER. New county records for Argyle [Scotland]. Jour. Botany 57: 322. 1919.—This is a list of new finds in Argyle during a visit there in September.—*K. M. Wiegand.*

334. GERTZ, OTTO. Några äldre litteraturuppgifter om *Vaccinium vitis idaea* L. f. *leucocarpa* Aschs. et Magn. [Some old reports on *Vaccinium vitis idaea* L. f. *leucocarpa* Aschs. and Magn.] Svensk. Bot. Tidskr. [Stockholm] 13: 109-110. 1919.—Author gives the three known localities in Sweden where the white whortleberry has been found and a brief resumé of the literature relating to their discovery.—*W. W. Gilbert.*

335. HARPER, ROLAND M. An interesting peat bog in New York City. Jour. Amer. Peat Soc. 11: 8-11. 2 fig. Jan., 1918.—A bog of interest, partly because of its urban position, and partly because of the abundance of *Decodon*. It is for many miles the only station of *Chamaedaphne* and *Sagittaria Engelmanniana*.—*H. C. Cowles.*

336. HARPER, ROLAND M. A sketch of the forest geography of New Jersey. Bull. Geog. Soc. Philadelphia 16: 107-125. 3 pl. Map. Oct., 1918.—The different geographic regions of the state are mapped and briefly described with reference to soil, topography, and tree growth. The trees are listed for each region and the most abundant species are indicated. In the state as a whole, the white oak is the most generally distributed tree, with the red maple a close second; the pitch pine holds first place from the standpoint of numbers.—P. D. Strausbaugh.

337. HARPER, ROLAND M. The supposed southern limit of the eastern hemlock. Torreya 19: 198-199. Oct., 1919.—*Tsuga canadensis* (L.) Carr., not previously seen further south in Alabama than Winston and Marion Counties, was found by the writer on the banks of Village Creek, about 3 miles southwest of Adamsville, Jefferson County, Alabama, on Sept. 2, 1919.—J. C. Nelson.

338. HEIMLICH, LOUIS F. The trees of White County, Indiana. Proc. Indiana Acad. Sci. 1917: 387-471. 34 pl. 1918.—Though primarily taxonomic, this paper is of interest to plant geographers, because of its maps, showing the distribution in the United States and by counties in Indiana of six species of *Quercus*, two species of *Viburnum* and *Salix*, *Betula lutea*, and *Malus ioensis*. [See Bot. Absts. 1, Entry 798.]—H. C. Cowles.

339. HEMSLEY, W. B., AND OTHERS. Flora of Aldabra: with notes on the flora of the neighbouring islands. Kew Bull. Misc. Inf. [London] 1919: 108-153. 1919.—Aldabra, or Aldabra Group, is an atoll in the Indian Ocean, 220 miles northwest of Madagascar. The series contains the islands of Aldabra, Assumption, Cosmoledo, Astove, Farquhar, Providence and St. Pierre situated between longitudes 45° E. and 52° E., and between latitudes 9° S. and 10.5° S. The list contains 68 species of vascular plants of which 18 are endemic to Aldabra, 13 are limited to Aldabra and adjacent islands while 18 occur also in Madagascar and 11 are found in East Africa. There is added a summary of present knowledge of the flora of Gloriosa, the Amirantes group, Coetivy, Agalega, Cargados, the Laccadives, Maldives, and the Chagos Archipelago. A bibliography of 26 titles completes the paper.—E. M. Wilcox.

340. INGHAM, W. Mosses and hepatics of the magnesium limestone of West Yorkshire [England] [Continued]. Rev. Bryologique 41: 77-82. 1914. [Issued in 1919.]—This is the concluding portion of an article the first part of which appeared in 1914 (Rev. Bryologique 41: 53-58). The region studied is very dry during the summer but affords more favorable conditions for the development of bryophytes during the winter. In many districts the limestone is honey-combed with old and long-disused quarries, which afford excellent collecting grounds. The author lists from his own collections 170 species and varieties of mosses and 24 species of hepatics, giving detailed data in each case. At the close of the paper he lists 28 additional species of mosses and 17 additional species of hepatics found by earlier collectors.—Alexander W. Evans.

341. KNOWLTON, CLARENCE H. An excursion to Mt. Washington, Massachusetts and the Bash-Bish Falls. Rhodora 21: 198-202. Nov., 1919.—An account of a one day collecting expedition to the region named, giving the general topography of the region and a list of the principal species collected. This list is compared with collections made by others in the same region. The locality proved to be interesting mostly because of the large number of species collected and the unexpected contrasts in the flora with variations in the topography and situation.—James P. Poole.

342. KNOWLTON, C. H., AND WALTER DEANE. Reports on the flora of the Boston district.—XXX. Rhodora 21: 78-83. Apr., 1919.—A continuation of the report of the Committee on Local Flora of the New England Botanical Club. Reports species and their distribution in the district about Boston, Massachusetts. [See also next following Entry, 343.]—James P. Poole.

343. KNOWLTON, C. H., AND WALTER DEANE. Reports on the flora of the Boston district. —XXXI. *Rhodora* 21: 125-128. 1919.—A continuation of the report of the Committee on Local Flora of the New England Botanical Club. Reports species and their distribution in the district about Boston, Massachusetts. [See also next preceding Entry, 342.]—*James P. Poole.*

344. LINDFORS, THORE. Sydskandinaviska element i Frostvikens flora [South Scandinavian elements in the flora of Frostviken (Province of Jämtland, Sweden)]. *Bot. Notiser* 1919: 127-136. 1919.—The plants belonging to this element are nearly always confined to localities favored with southern exposure, only exceptionally in groves on level ground with calcareous soil. The author records 14 such "south-mountains" or "south-hills," and gives the localities of 25 South Scandinavian plants in this region of northern Sweden.—*P. A. Rydberg.*

345. LINDQUIST, H. Utbredningen inom europeiska Ryssland av *Carex arenaria* L., *Carex ligerica* Gay [= *C. colchica* Gay, *C. pseudoarenaria* Rchb.] och *Carex praecox* Schreb. (= *C. Schreberi* Schrank). [The spread into European Russia of *Carex arenaria* L., *C. ligerica* Gay and *C. praecox* Schreb.] *Svensk. Bot. Tidskr.* [Stockholm] 13: 100-102. 1919.

346. LITTLE, J. E. Notes on Bedfordshire plants. *Jour. Botany* 57: 306-312. 1919.—A list is given of publications dealing with the flora of Bedfordshire. The present paper presents a selection of records supplementary to the "Field flowers of Bedfordshire," by W. F. BUNKER, 1911. HILLHOUSE suggested that the county be divided somewhat on the basis of the surface geology into 49 divisions, a number wholly unworkable on any extended scale, and not desirable for so small a county. The Victoria County History divides the county on the basis of river basins, making 7 divisions, which may be merged into 5. The present records all fall in HILLHOUSE's southern half (soil chiefly cretaceous). REV. CHAS. ABBOT's *Flora Bedfordensis* (1798) contained several names of plants not now known there, and also some which were rare then but are now more common. The new records with stations and critical notes, are comprised in a list several pages in length.—*K. M. Wiegand.*

347. LONG, BAYARD. Notes on the American occurrence of *Crepis biennis*. *Rhodora* 21: 209-214. 1919.—The genus *Crepis*, native to the Old World, is represented in eastern United States by several introduced species. It has been the consensus of opinion that four of these have become well enough established to be recognized as elements of our flora. Among these is *C. biennis* which is credited by the American manuals with a more or less extended range from New England southward to Pennsylvania and westward to Michigan. In verifying the records of the range of this species the writer found only one authentic herbarium specimen from Pennsylvania, one from Vermont, collected by Pringle in 1875, and a third collected in North Carolina in 1888. All other records were based on wrongly labelled specimens of other species. Since the large collections examined showed only these three authentic specimens and these from ancient collections, much new evidence is needed to maintain this species as an element of our flora.—*James P. Poole.*

348. LONG, C. A. E. Notes from Matinicus [Maine]. *Rhodora* 21: 148. 1919.—Five or six plants of *Amsinckia Douglasiana* A.DC., a native of California, were found growing in and near an abandoned chicken yard on the Island of Matinicus, twenty miles off the Maine coast. The identification was made by M. L. FERNALD. It is as yet uncertain whether this plant has become established or is a casual.—This same island is a hitherto unpublished station for *Typha angustifolia* L., although the station has been known to the writer for a number of years. The most easterly station previously published was the lower Kennebec.—*James P. Poole.*

349. LUNDEQUIST, OLOF. Några anmärkningsvärda växter från Gränna och Visingsö. [Some noteworthy plants from Gränna and Visingsö (Sweden)]. *Svensk. Bot. Tidskr.* [Stockholm] 13: 104-106. 1919.—A list of 28 plants is given with brief notes on locality, date and collector.—*W. W. Gilbert.*

350. MACCAUGHEY, VAUGHAN. The endemic palms of Hawaii: *Pritchardia*. *Plant World* 21: 317-328. Dec., 1918.—A general discussion is given of the genus *Pritchardia*, which includes all the endemic palms of the Hawaiian Islands. The author indicates the geographical distribution of sixteen species, and the outstanding features of the roots, trunks, leaves, and inflorescences, common to all the species are described.—*Charles A. Shull*.

351. MACCAUGHEY, VAUGHAN. The pala or mule's-foot fern (*Marattia Douglasii* (Presl.) Baker) in the Hawaiian Archipelago. *Torreyia* 19: 1-8. Jan., 1919.—This species, which is common to the Fiji Islands, is the sole representative of the Marattiales in the Hawaiian flora. Its presence there may be explained by introduction from the Fiji Islands, either naturally or through human agency, or it may be a relict of a more widespread display of Marattiales on a former greatly enlarged Hawaii, "Pan-Hawaii-land." [See Bot. Absts. 2, Entry 979.]-*H. C. Cowles*.

352. MACCAUGHEY, VAUGHAN. The genus *Morinda* in the Hawaiian flora. *Plant World* 21: 209-214. Aug., 1918.—A brief description of the Rubiaceae genus *Morinda*, followed by a more detailed description of the two Hawaiian species: *M. citrifolia* and *M. trimera*. The first of these is a familiar dye-tree of India, Malaya and the Pacific islands, a fact that may account for its migration into the Hawaiian islands. The second species is endemic and may have arisen as a mutant from *M. citrifolia*.—*P. D. Strausbaugh*.

353. MOXLEY, G. L. A botanical trip to Catalina Island. *Amer. Bot.* 25: 93-94. 1919.

354. NELSON, J. C. The rarity of *Conopholis*. *Amer. Bot.* 25: 151. 1919.—*Conopholis americana* reported as not rare in Kentucky.—*W. N. Clute*.

355. NELSON, J. C. Species east and west. *Amer. Bot.* 25: 70-71. 1919.—A comparison of the flora of Boone County, Kentucky, with that of Chelan County, Oregon, shows that while the total number of species is about the same, there are only 47 species of plants that appear in both lists; when the introduced species are eliminated, only 17 species are found in both lists, and these are recognized as cosmopolitan.—*W. N. Clute*.

356. NELSON, J. C. Oregon *Chenopodiums*. *Amer. Bot.* 25: 112. 1919.

357. NELSON, JAMES C. The grasses of Salem, Oregon, and vicinity. *Torreyia* 19: 216-227. 1919.—A list is given of grasses growing spontaneously in that part of the Willamette Valley adjacent to the city of Salem, prefaced by brief notes on topography and climate. 108 species are enumerated, of which 57 are introduced and 51 native. The preponderance of introduced individuals is noted. A steady increase of introduced species is predicted. The grass species are classified ecologically in six societies, riparian, hydrophyte, xerophyte, silvicolous, submontane and ruderal.—*J. C. Nelson*.

358. NORDBERG, ARNE. Ny fyndort för *Cypripedium*. [A new locality for *Cypripedium*.] *Bot. Notiser*. 1919: 167. 1919.—*Cypripedium Calceolus* L. is recorded from subarctic Sweden, at Sunderbyskogen, Nedre-Luleå Parish, and a list is given of 17 other plants associated with it.—*P. A. Rydberg*.

359. NORDSTEDT, O. Sandhems Flora 6. Tillägg. [Flora of Sandhem, 6. Additions.] (Swedish.) *Bot. Notiser* 1918: 309. 1918.—Many additional plant localities recorded.—*P. A. Rydberg*.

360. PETCH, T. *Oxalis* in Ceylon. *Ann. Roy. Bot. Gard. Peradeniya* 7: 47-51. 1919.—Notes on the introduction and spread, as weeds, of *Oxalis corymbosa* DC. and *O. latifolia* HBK.—*E. D. Merrill*.

361. PHELPS, ORRA PARKER. *Ranunculus Boreae* in eastern New York. *Rhodora* 21: 208. Nov., 1919.—Plants of this species, which has not before been noted in America, found in New York and identified at Gray Herbarium. The species is native to continental Europe.—*James P. Poole*.

362. PRETZ, HAROLD W. Discovery of *Trisetum spicatum* in Pennsylvania. *Rhodora* 21: 128-132. 1919.—On July 15, 1917, the writer collected, near Slatington, Pennsylvania, a specimen of *Trisetum spicatum*. The plant was found rather evenly distributed and quite abundant about the open outcrops of the rather short, steep part of the shale slopes close to the tracks of the Lehigh Valley Railroad. A brief discussion of the habitat and the associated species is given.—As far as the writer knows this plant has not been previously reported as occurring between New York and North Carolina. The article is concluded with a discussion of the physiographic and geographic relation of this station to those previously reported.—*James P. Poole*.

363. RINGENSON, C. A. *Sedum villosum* L. två gånger funnen i Jämtland. [*Sedum villosum* L. found twice in Jämtland. (Sweden)] *Svensk. Bot. Tidskr.* [Stockholm] 13: 106. 1919.

364. RYDBERG, P. A. Phytogeographical notes on the Rocky Mountain region. VIII. Distribution of the montane plants. *Bull. Torrey Bot. Club* 46: 295-327. 1919.—The montane zone of the Rocky Mountain region is defined. The number of species included is given as about 1900, 13 per cent of which are transcontinental; 18.5 per cent are common to the Rockies and Canadian zone of the east, 30 per cent common to the Rockies and the Pacific mountains, and over 53 per cent are endemic. A comparison is also made of the species of the northern and of the southern Rockies.—*P. A. Munz*.

365. STANDLEY, PAUL C. A new locality for *Senecio Crawfordii*. *Rhodora* 21: 117-120. 1919.—All of the specimens of *Senecio Crawfordii* cited by GREENMAN in his monograph of the genus were from southeastern Pennsylvania and western New Jersey. The writer cites a new locality discovered in May 1917 in a bog near Suitland, Maryland, a few miles east of Washington. A somewhat detailed description of the station and similar bogs is given, together with a list of the characteristic species found in them. These are also the characteristic species of the pine-barrens of New Jersey, although no pine-barrens exist in the region cited. The habitat of the species in Maryland is different from that in which it occurs in Pennsylvania and New Jersey, where it is not in a pine-barren association.—*James P. Poole*.

366. STRÖMMAN, P. H. *Lepidium Smithii* Hook. funnen i Skåne. [*Lepidium Smithii* found in Skåne (Sweden).] *Svensk. Bot. Tidskr.* [Stockholm] 13: 106-107. 1919.

367. THOMPSON, H. S. *Galium erectum* in Somerset [England]. *Jour. Botany* 57: 286. 1919.—A note on the occurrence of this plant.

368. TURRILL, W. B. Contributions to the flora of Macedonia. II. *Kew Bull. Misc. Inf.* [London] 1919: 105-108. 1919.—This is a list of seed plants collected by J. M. Russell during July and August, 1918, in the Paprat District, Krusa Balkan, Central Greek Macedonia. The collection adds materially to the number of species recorded in flower under the extreme xerophytic conditions of mid-summer, during which time, with the exception of xerophytes, green vegetation is restricted to such protected habitats as the nullahs. Forty of the species were previously recorded [Kew Bull. 1918: 249-341. See also Bot. Absts. 4, Entry 308.] while fourteen are here listed for the first time.—*E. M. Wilcox*.

369. WANGERIN, WALTHER. Die pflanzengeographische Bedeutung der Verbreitungsgrenze von Buche und Fichte für das nordostdeutsche Flachland. [The phytogeographic significance of the distribution limit of beech and spruce for the lowland of northeast Germany.] *Ber. Deutsch. Bot. Ges.* 36: 559-571. 1918 [Feb., 1919].—The beech has by some been considered to constitute a border line form separating the European from the Russian-Siberian flora. Other investigators consider the beech forest to form a transition zone between middle and eastern Europe. The spruce is more difficult to interpret, and opinions regarding its importance are at variance. The beech associates may be typical companion plants and cease at the limits of the beech forests; or they may be only apparent beech associates, and extend beyond the domain of the beech.—*Ernst Artschwager*.

370. WEATHERBY, C. A. Long Pond. *Rhodora* 21: 73-76. Apr., 1919.—An account of a botanizing expedition to Long Pond in the town of Thompson, Connecticut, where many species not previously reported from that part of the state were found.—*James P. Poole.*

371. WILLIS, J. C. The floras of the outlying islands of New Zealand and their distribution. *Ann. Botany* 33: 267-293. 2 fig. 1919.—The series of studies in which the age-and-area hypothesis was tested in connection with the flora of the New Zealand region is here continued with reference to three sets of outlying islands, the Kermadecs, Chathams and Aucklands. Assuming the hypothesis to be correct the author makes thirty-two predictions regarding the constitution and distribution of the floras of these islands. Every prediction is verified when the actual facts are examined. The facts do not support the theory of natural selection. From these results and those of previous studies the conclusion is drawn that the principle of age-and-area is perhaps the chief positive factor in determining the distribution of plants about the globe, the chief negative factor being the action of barriers. A restatement of the hypothesis is made.—*W. P. Thompson.*

372. WILSON, E. H. A phytogeographical sketch of the ligneous flora of Korea. *Jour. Arnold Arboretum* 1: 32-43. July, 1919.—An account of the ligneous vegetation of Korea and adjacent islands. The geological formation and its influence on the distribution of the woody plants are described, also the topography of the area in question which comprises 84,173 square miles. The surface rocks of Korea are granites, metamorphosed pre-Cambrian rocks, palaeozoic rocks, mesozoic limestones, and basalt. The country is very mountainous, and has no extensive plateaus nor plains. The original forest covering has been destroyed over fully two-thirds of the country, extensive forests remaining only in the extreme north. The elements of the flora are mainly boreal in character, and essentially those of North China, Manchuria and Japan; broad-leaved evergreens are almost absent. At least one ligneous genus, *Pentactina* and a limited number of species are endemic. The flora of the islands of Quelpaert and Dagelet shows closer relationship to that of Japan, with some endemic species on each. Woody plants make up about one-fourth of the phaenogamic flora, which consists of 2832 species thus far recorded. The more important and noteworthy trees and shrubs are mentioned with notes on their general aspect, distribution and economic importance. The largest deciduous tree is *Populus Maximowiczii*; *Quercus mongolica*, *Betula Ermanii* and *Prunus serrulata* var. *pubescens* are the most widely distributed trees. The commonest coniferous trees are *Pinus densiflora* and *P. koraiensis*. The author discusses succession of forest growth as exemplified by the forests of Korea. The concluding paragraphs deal with trees and shrubs of economic and ornamental value.—*Alfred Rehder.*

373. WILSON, E. H. The Bonin Islands and their ligneous vegetation. *Jour. Arnold Arboretum* 1: 97-115. 1919.—After an account of the history of the islands and some remarks on their geological features the author, who spent two weeks on these islands, discusses their ligneous vegetation. Lists of all the trees, shrubs and woody climbers hitherto known from these islands are given, and a list of vernacular names with their botanical equivalents concludes the article.—*Alfred Rehder.*

FLORISTICS

374. CHANEY, RALPH W. The ecological significance of the Eagle Creek flora of the Columbia River gorge. *Jour. Geol.* 26: 577-592. 4 fig. 1918.—In a preliminary report upon fossil plant material found in the gorge of the Columbia River, in Oregon and Washington, Chaney notes that some 80 species are represented; 75 of these are angiosperms, of which 2 only are monocotyledons. A list of the genera with the number of species in each includes: *Ginkgo* 1, *Pinus* 1, *Smilax* 1, *Cyperacites* 2, *Populus* 3, *Salix* 3, *Hicoria* 2, *Juglans* 1, *Alnus* 1, *Carpinus* 1, *Corylus* 1, *Castanea* 1, *Quercus* 12, *Ulmus* 2, *Planera* 2, *Magnolia* 1, *Laurus* 2, *Platanus* 2, *Liquidambar* 3, *Crataegus* 1, *Sterculia* 1, *Rhus* 1, *Ilex* 1, *Acer* 3, and *Fraxinus* 1.—From a study of this material the author concludes that the climate indicated by this Eagle Creek flora appears to have been somewhat warmer and drier than at present. The length of the epoch is

to be placed at thousands rather than at scores of years. The dominant plants point to the existence of two habitats, one xerophytic and the other mesophytic. An area of upland dissected by a valley furnishes such habitats and at the same time meets the geological requirements of the formation. [See Bot. Absts. 1, Entry 1603.]—*Geo. D. Fuller.*

375. CLEMENTS, F. E. Scope and significance of paleo-ecology. *Bull. Geol. Soc. Amer.* 29: 369-374. 1918.—The article is a general statement of the scope and character of paleo-ecology and of some of the results that may be hoped for from its application to some of the problems of geology. The conclusions are summarized by the author in the statement that "Paleo-ecology is characterized by its great perspective, due to the absence of a large body of facts. This causes the fundamental correlations between the physical world and vegetation on the one hand and between vegetation and the animal world on the other to stand out in clear relief. As a consequence, paleo-ecology is an unspecialized field in which the inter-relations of climate, vegetation and animals play the paramount rôle. The emphasis necessarily falls on vegetation, because it is an effect of climate and topography, and a cause in relation to the animal world, and hence serves as a keystone in the whole arch of cause and effect." [See Bot. Absts. 1, Entry 1604.]—*Geo. D. Fuller.*

376. GUPPY, H. B. The island and the continent. *Jour. Ecol.* 7: 1-4. May, 1919.—Referring to HOOKER's discussion of insular floras the author agrees with him that islands have been the refuges of the ancient vegetation of continents. On the Micronesian Islands in particular he sees the wrecks of a very ancient flora once more widely spread and flourishing in the warmer and moister Tertiary period but expelled and largely destroyed during a succeeding age of aridity. Australia is regarded as giving the plant record of lost eras of much of the globe and Madagascar as recounting the tale of lost ages in the tropical zone. The question of continental connections is regarded as a dead issue and the distribution of conifers is accepted as the best guide to past continental extensions.—The article is rather a general statement of the situation under discussion than a contribution of fresh data regarding the character of insular floras.—*Geo. D. Fuller.*

377. HOLMSEN, GUNNAR. Lidt om grangrænsen i Fämundstrakten. [Norway spruce in Fämund, Norway.] *Tidsskr. Skogbruk* 27: 39-48. Mar.-Apr., 1919.—It has been a generally accepted theory that Norway spruce reached Norway from Russia by way of Finland and Sweden, that sufficient time has not yet elapsed for it to cover every nook and corner of the country as shown by the present distribution. The author has endeavored to throw light on this question by a microscopic study of pollen in old swamp deposits. Pollen grains of spruce have thus been readily identified when present. Though there remain many unsolved problems, this study indicates strongly that spruce is no younger on the peninsula than the other forest trees. It appears that the immigration of spruce took place toward the end of the sub-boreal or in the early sub-atlantic era and that spruce appeared earlier in the northern and eastern part of Sweden than elsewhere.—*J. A. Larsen.*

APPLIED ECOLOGY

378. KINCER, JOSEPH B. Temperature influence on planting and harvest dates. *Monthly Weather Rev.* 47: 312-323. *Fig. 1-20.* 1919.—There are certain restricted limits of time within which crops must be planted for best results, defined by the temperature conditions of the locality. In general the length of the time period for planting decreases with increase in latitude.—A definite amount of heat is required after planting to bring a crop to maturity; one may take as a rough measure of this the accumulated day-degrees of temperature above the mean temperature at planting time. As thus computed there is very little difference in the amount of heat necessary to mature most staple spring planted crops. The mean temperature at planting time for a given crop may be used as a base for any method of temperature summation for that crop, but not as a general base for all crops. If the frequently used 6°C. base be employed in the case of cotton, for example, we would begin the reckoning of effective

temperatures in the vicinity of Abilene, Texas, about three months before planting can begin, with a resulting indicated large accumulation of effective temperature before any growth is possible.—Spring wheat seeding begins with a lower mean temperature than any other major spring crop, for example, in the Dakotas and in Nebraska when the normal daily temperature rises to 37°F. and in Minnesota and Wisconsin when 40°F. is reached. Next in thermal order come spring oats, the seeding of which usually begins when the normal daily temperature rises to 43°F. Early potato planting begins as a rule when the normal daily temperature rises to 45°F. and corn when 55°F. is reached. The dates on which the latter is reached correspond closely to the average dates of the last killing frost in the spring. Cotton planting usually does not begin until the normal daily temperature rises to about 62°F. The dates on which this temperature is reached correspond closely to the latest dates for a killing frost.—Cotton and corn are warm-weather crops and the areas in which these can be successful productions on a commercial scale are limited principally by general temperature conditions and the temperature at which planting may be accomplished. These limits are defined by an available thermal constant of about 1600°F. for corn and about 2000°F. for cotton, computed from the normal temperature when planting usually begins. If cotton could be planted with as low temperatures as corn, the cotton area would be materially increased.—Owing to the relatively large thermal requirements of corn and cotton, a comparatively warm spring is necessary for the best results in germination and early growth.—*Joseph B. Kincer.*

379. McLEAN, FORMAN T. The importance of climatology to tropical agriculture. *Philippine Agric.* 7: 191-194. 1919.—A brief discussion of the relation of the climate (temperature, evaporation, wind, sunlight, rainfall, etc.) to Philippine agricultural crops, with a plea that adequate investigations be instituted as a basis for instruction in climatology at the College of Agriculture.—*S. F. Trelease.*

380. SAMPSON, ARTHUR W. Plant succession in relation to range management. U. S. Dept. Agric. Bull. 791: 76 p. 23 fg. 1919.—A study of plant succession in the vicinity of the Great Basin Experiment Station in Utah with especial reference to the use of plant consociations as determiners of factors necessary to the improvement of grazing ranges. Four plant consociations are discussed, namely, the wheat-grass, the porcupine-grass-yellow-brush, the foxglove-sweet-sage-yarrow and the ruderal-earlyweed consociations. The nature of each of these plant succession groups is illustrated in detail by a treatment of such factors as conditions of growth and reproduction, soil water content, effect of disturbing factors, palatability and forage production. The most ideal conditions of soil fertility, and moisture for optimum forage production on a given range are indicated by plants of the wheat-grass groups and the least ideal conditions by plants of the last named group in the order above enumerated. The prevalence of plants of any one of these consociations thus becomes an indicator of whether or not destructive factors may be at work. Overgrazing by removing the original ground cover facilitates soil erosion which in turn reduces the fertility and humus content. This reduction in turn results in the introduction of the plant consociation next lower in the scale. Protection of the depleted range may be accomplished in part by grazing only after seed production rather than grazing before seed production. There is included a list of the most common species found in each consociation which may be used as an indicator of the condition of the range.—*E. V. Hardenburg.*

381. SAMPSON, ARTHUR W., AND L. H. WEYL. Range preservation and its relation to erosion control on western grazing lands. U. S. Dept. Agric. Bull. 675. 35 p. 1918.—In the Manti National Forest of Utah the destruction of the vegetation carpet by overgrazing, especially by sheep, has resulted in serious damage by erosion. The peak of this destruction is in the spruce-fir basins, where the slopes are steep, the trees sparse, and the summer grazing conditions good. On eroded areas new successional stages are seen, and the reestablishment of the more desirable species for grazing means good range management extended over a term of years. Deferred and rotation grazing and stock control are necessary. Damage resulting from long-continued erosion can best be overcome by terracing, planting, and the construction of dams. See Bot. Absts. 2, Entry 18; Exp. Sta. Rec. 39: 439-440; also rev. by: TOUMEY in Jour. Forestry 16: 814-817.—*H. C. Cowles.*

382 SIM, T. R. Soil erosion and conservation. South African Jour. Indust. 2: 867-881. 1919.—Where the grassveld is so vigorous that it cannot be grazed sufficiently by the full stock of the farm without annual or frequent burning, then that veld is naturally tree veld rather than grass-veld. Where the grass-veld and some cultivation carry the full stock of the farm through successive years without grass burning, there is little excuse for burning. The destruction of a bush which has existed for centuries results in the area reverting to grass land for a time, followed later by further retrogression.—*E. P. Phillips.*

383. SMITH, W. G. The improvement of hill pasture. Reprint from Scottish Jour. Agric. 1: 1-8. July, 1918.—Hill pasture is defined as "land never ploughed and not enclosed as fields. Sixty per cent of the area of Scotland (18,000 square miles) is uncultivated land or hill pasture." Different types of herbage occur and these represent distinct plant associations which the author designates by applying the name of the dominant plant, or some term descriptive of the general habitat. Each association "indicates some particular combination of climate, soil, and grazing animals." The principle upon which improvement is based is found in the fact that the herbage changes in proportion to the changes effected in conditions under which it grows.—(1) Alluvial and flu-h grassland, the former occurring on the alluvial borders of streams and the latter occupying areas of seepage associated with the outflow of springs, represent the better type of hill grassland. Such areas are made more extensive by irrigation. Water draining from peat soils must be conducted away from alluvial grassland by definite channels, as it is injurious to the grasses of this association. Places where water lodges must also be drained. (2) The bracken association includes a fine grassy herbage which can be developed by removing the taller bracken either by cutting or spraying with 5 per cent sulfuric acid. (3) Heather land characterised chiefly by *Calluna* may be improved by burning with due regard to proper rotation; a fifteen year rotation is recommended in which one-fifteenth of the moor is burned each year. (4) Plant herbage consisting mainly of sedges (*Eriophorum* and *Scirpus*) and heather may be improved by drainage or burning depending upon the types of herbage desired. (5) Rough grass and bent consisting of mat grass (*Nardus stricta*), blow grass (*Molinia caerulea*) and dwarf heather occur on the "higher hills of southern and central Scotland." Improvement is effected by removing the previous season's growth in order to induce a fresh early growth. Burning in large blocks is advised and grazing by hardier breeds of cattle to reduce the roughness of the herbage. On such areas spring flushing and diverting of the surface water favors the substitution of the rough grass by a finer herbage.—*P. D. Strausbaugh.*

384. WELLS, MORRIS M. The relation of ecology to high school biology. School Sci. Math. 18: 439-446. May, 1918.—Teaching biology requires more effort than in better standardized subjects, as physics and chemistry. There are two main problems; the organization of the course, and the securing of material. Ecological methods should be introduced. Teachers should become thoroughly acquainted with local regions. Plants and animals should be studied together. Ecology deals with the organism as a whole, and takes little account of the physiology of organs. Ecology is essentially natural history. Biology is awakening from the lethargy of extreme specialization. The man who revolutionized biology in 1859 was not a product of a man-made laboratory, but a scientist who secured his information from the laboratory of nature. The transfer of the study of biology from the laboratory to the field will be the procedure followed by all enthusiastic teachers.—*A. Gundersen.*

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, *Editor*J. V. HOFMANN, *Assistant Editor*

385. ALDABA, VICENTE C. Cultivation and tapping of *Castilloa* rubber in the Philippines. *Philippine Agric.* 7: 274-307. 1919.—The author reports observations and experiments on trees of *Castilloa elastica* in a plantation in Davao, Mindanao, where conditions are favorable for this plant. Discussions are given of methods of cultivation, diseases and pests, light requirements, growth rates, variations in amount and quality of rubber, improvement by selection, spacing, and tapping methods.—*S. F. Trelease.*

386. ANONYMOUS. The cultivation of basket willows. *Jour. Bd. Agric. Great Britain* 25: 1424-1432. 1919.

387. ANONYMOUS. Ninety-seventh report of the commissioners of His Majesty's woods, forests and land revenues, dated 27 June, 1919. 53 p. London, England. 1919.—A statistical report on these subjects with brief comments and explanations. Exclusive of land let for building purposes, foreshores and mineral rights, the Crown property in charge of the Commissioners includes about 350,000 acres, of which about 69,554 acres are under the growth of timber. Parts of these woodlands are subject to common rights, and, in addition, 126,646 acres of unenclosed wastes are subject to common rights. The total gross income for the year was £1,115,185 and the expenditure £367,561. For the preceding year these figures were £1,057,190 and £364,430, respectively. In order to supply in part the nation's needs for railway sleepers (crossties), pitwood, etc., thus reducing timber imports, extensive felling and sawing operations were continued in several of the Crown forests, especially in the New Forest, and large quantities of timber were sold to the Controller of Timber Supplies and others. To provide for planting the areas of woodland cleared during the war (and also for the afforestation of other areas), over 44 millions of plants have been raised from seed sown in 1915, 1916, and 1917. About two million surplus plants available last autumn, after meeting the immediate Crown requirements, were disposed of, principally to nurserymen at estimated cost prices, under conditions restricting the price to be charged by them on resale to landowners and others. The 1918 seed crop was a very poor one, but notwithstanding this, further large quantities of seed were purchased abroad and a considerable amount of larch and Scotch pine seed was collected at home. Steps were taken to replant parts of the areas recently felled, but the work was restricted by the shortage of labor. The school for foresters or woodmen students at Parkend (Dean Forest), which was extended to accommodate a larger number of students, and which had been temporarily closed by the war, was reopened February 20, 1919. It is intended to use Dean Forest and the adjoining woodlands of Highmeadow, Abbotswood and Clearwell as a forestry demonstration area whenever the school for forest students, near Speech House, is developed.—*E. R. Hodson.*

388. ANONYMOUS. [Rev. of: MÜLLER. Über die kursächsische Oberforst- und Wildmeisterei im Erzgebirge. (The forest and game administration in the Erzgebirge under the Electorate of Saxony.) Tharandter Forstl. Jahrb. 1917: 26. Also 1918: 91, 342.] Forstl. Rundschau 20: 10-12. 1919.—Form of organization of forest and game administration, officials and their duties, regulations and methods, during the period 1500 to 1800.—*F. S. Baker.*

389. ANONYMOUS. Better packages and how to know them. *Sci. Amer.* 120: 546, 559-560. 4 fig. 1919.—Descriptive of wooden boxes and methods of testing their strength.—*Chas. H. Otis.*

390. ANONYMOUS. Camphor. *Agric. News* [Barbados] 18: 385. 1919.—The author, after noticing the camphor shortage in the United States and the present high prices ruling for the product, passes on to a discussion of the different kinds of camphor trees and the degree of success which has attended the cultivation of camphor in different countries. Mention is made of trials in the West Indies, particularly in Dominica and Trinidad where camphor trees are being planted as windbreaks and hedges.—*J. S. Dash.*

391. ANONYMOUS. The Coos County forests. *Sci. Amer* 120: 3. 1919.

392. ANONYMOUS. The dendrograph. *Sci. Amer.* 120: 365. 1919.—Descriptive of two types of apparatus for recording growth and other variations in the dimensions of trees.—*Chas. H. Otis.*

393. ANONYMOUS. Enhetliga inmättningsregler för rundvirke. [Uniform rules for measuring round timber.] *Skogen* 6: 247-252. 1919.—Uniform rules have recently been adopted in Sweden for measuring fire wood, pulpwood, and saw timber. Fire wood is measured in cubic meters; pulpwood and saw timber may be measured either in cubic meters or in English units. The rules also prescribe how different classes of material shall be piled for measuring.—*G. A. Pearson.*

394. ANONYMOUS. Forest fires of spontaneous origin. *Sci. Amer.* 120: 47. 1919.

395. ANONYMOUS. Japanese air-cushions of paper. *Sci. Amer.* 121: 463. 1 fig. 1919.—An industry utilizing bamboo fiber.—*Chas. H. Otis.*

396. ANONYMOUS. Das Papierholz. [Wood for paper.] *Oesterreich. Forst- u. Jagdzeitg.* 1926: 314. December 5, 1919.—Paper industry in Austria demands larger amounts of wood every year and it is becoming difficult to secure within reasonable distance. Branchwood and tops do not appear usable to any great extent. Trunkwood of rapid growth, having narrow fall rings and a light colored heart is a necessity for the manufacture of high grade paper.—*F. S. Baker.*

397. ANONYMOUS. [Rev. of: ANONYMOUS. A new drying oil. *Paint Mfrs. Assoc. Circ.* 75. 1919.] *Jour. Franklin Inst.* 189: 62. 1920. Oil from seeds of *Aleuritis trisperma* or soft lumbang found to be an excellent drying oil on a par with tung oil.—*Ernest Shaw Reynolds.*

398. ANONYMOUS. [Rev. of: MARCHET, JULIUS. *Waldflächen und Holzproduktion von Osterreich.* [Forest areas and wood production of Austria.] Vienna, 1919.] *Oesterreich Forst- u. Jagdzeitg.* 1924: 303. Nov. 21, 1919.—Statistics on forest products in Austria.—*F. S. Baker.*

399. ANONYMOUS. [Rev. of: *Trocknung und Konservierung von Holz durch Elektrizität.* (Drying and preserving wood by electricity.) *Deutsche Drechsler Zeitg.* 2. 1915.] *Oesterreich. Forst- u. Jagdzeitg.* 1922: 294. Nov. 7, 1919.—A current of electricity passed through green wood oxidizes the resinous components of the sap, causes a physical change in the wood structure that makes it stronger and more resistant to decay and kills all decay spores, rendering the wood aseptic. In practice the freshly cut wood is placed in piles not over 1 or 1.5 meters high through which a current of 80 to 100 volts is passed transversely. Three to 6 kilowatts per cubic meter are required to complete the treatment.—*F. S. Baker.*

400. ANONYMOUS. Why there is a limit to forests. *Sci. Amer.* 121: 191. 1919.—It is held that the clearing of the land has frequently paved the way for industrial and agricultural expansion, which has produced greater wealth than did the forest industries in their prime.—*Chas. H. Otis.*

401. BAMBER, M. KELWAY. The rubber manuring experiments at Peradeniya for 1918. *Tropic. Agriculturist* 52: 185-189. 1919.—Five years' results of fertilizer experiments on rubber plants are reported which show an excess of acid phosphate to have the greatest effect on late production while general manures, excess nitrogen, and excess potash have lesser effect in the order named. Full report of details given in *Bull.* 36, June 1918, of Peradeniya Exp. Sta., Ceylon.—*R. G. Wiggans.*

402. BARRE, H. W. Creosoting fence posts. *South Carolina Agric. Exp. Sta. Bull.* 201: 1-15. *Fig. 1-2.* 1919.

403. BESEMFELDER, EDUARD R. Heimisches Terpentinöl und Harz. [Domestic turpentine oil and rosin.] Forstwiss. Centralbl. 41: 49-53. 1919.—During the war a method was devised by which pine lumber can be dried in three days. The process yields a considerable amount of turpentine and rosin as by-product. The total pine wood cut each year in Germany could yield some 378,000 metric tons of extract, of which about one-fourth would be oils, the rest turpentine and rosin. The total consumption of imported pine oils by German industries amounted in 1913 to 57,000 tons, worth 39,000,000 million marks. Since spruce yields as much oil as pine, this process opens an opportunity for wood pulp manufacturers, who use both woods.—W. N. Sparhawk.

404. BIBB, T. W. Burning the profits. A problem confronting the lumber industry of the Pacific Coast. Sci. Amer. 121: 110-111. 4 fig. 1919.

405. BROWN, W. II. Vegetation of Philippine mountains. The relation between the environment and physical types at different altitudes. Philippine Bureau of Sci. Publ. 13: 1-434. Pl. 1-41, fig. 1-30. 1919.—See Bot. Absts. 4, Entry 180.

406. BRUBAKER, H. W. A study of the oil from sumac (*Rhus glabra*). Jour. Indust. Eng. Chem. 11: 950. 1919.—Sumac oil compares favorably in properties with other vegetable oils such as cottonseed or corn oil and may find a use as an edible oil or in the soap making industry or as a semi-drying oil in the paint industry.—Henry Schmitz.

407. BUTLER, O. M. "Built-up wood." Amer. Forest. 25: 1410-1414. 7 fig. 1919.—An article dealing with experimentation with laminated wood and certain manufactured articles therefrom, as conducted at the Forest Products Laboratory at Madison, Wisconsin.—Chas. H. Otis.

408. CHANCEREL, L. Note sur les meilleures essences de boisement dans la region du centre. [Note on the best species for reforestation in the region of The Centre.] Ann. Sci. Agron. Française et étrangère 35: 285-287. 1919.—Following some variety testing of leafy and resinous trees, begun in 1909, recommendations are made for reforestation in the region of The Centre, where a maximum of woody material in a short time was desired. The plantings were made in a poor sandy soil, which was dry in the summer, wet in places in the winter and, on the whole, unfit for agricultural purposes. Recommendations are as follows: (1) Leafy: *Quercus palustris*, *Quercus rubra* and *Quercus phellos*; *Betula nigra* var. *rubra*; *Alnus cordifolia*; *Populus balsamifera*, *Populus nigra* var. *angulata robusta*. (2) Resinous: *Pinus maritima* Hamilt. var. *Corte* mixed with *Pinus sylvestris* vars. *Riga* and *Scotica*; *Pseudotsuga Douglasii*; *Picea Menziesii*; *Cedrus deodara*.—A. B. Beaumont.

409. CHAPMAN, H. H. Forestry as a vocation. Amer. Forestry 25: 1075-1077. 1919.

410. CLOPPER, H. S. The "Wye Mills oak." Amer. Forestry 25: 1482-1483. 3 fig. 1919.—Describing a remarkable old tree located in Queen Anne County, near Wye Mills, Maryland.—Chas. H. Otis.

411. COWAN, JAMES. Crop production in the northern sandhills. Nebraska Agric. Exp. Sta. Bull. 171. 8 p. 1919.—See Bot. Absts. 4, Entry 52.

412. DAHL, A. L. Trees for the desert. Uncle Sam to re-forest barren areas. Sci. Amer. Supplem. 87: 188-189. 5 fig. 1919.

413. DANIELS, O. T. [Forest fires in Nova Scotia.] Fruit Growers' Assoc. Nova Scotia Ann. Rept. 55: 52-58. 1919.—An account is given of forest fires in Nova Scotia in 1918, their extent and causes. The number of acres burned over was 58,380 and the total damage was \$139,110.—Paul A. Murphy.

414. DAVIS, R. O. E. Erosion in the Appalachian and Piedmont regions. Amer. Forestry 25: 1350-1353. 5 fig. 1919.

415. DE BOER, S. R. Landscape architecture in our national forests and parks. Amer. Forestry 25: 1459-1464. 8 fig. 1919. Concerns recreation and recreation facilities.—*Chas. H. Otis*.

416. EBERTS. Die Jagd in den Staatsforsten der grösseren deutschen Bundesstaaten. [The hunt in the state forests of the larger German states.] Forstwiss. Centralbl. 41: 41-49, 91-101, 132-148. 1919.—Methods of administering and utilizing the game resources of the state forests of Prussia, Bavaria, Saxony, Württemberg, Baden, Hesse, Mecklenburg-Schwerin and Brunswick are described in considerable detail. The system of leasing hunting privileges to the highest bidder often yields a larger net income at first, but is likely to result either in depletion of the game or overstocking harmful to the forest, is bad for the morale of the forest personnel, often leads to friction, and injures the communal hunting business both by depleting the reservoirs of game on the larger state forests and by reducing their income from leases through competition for lessees. The best method for all interests concerned is a system of state administration of hunting, through the forest personnel, with the income turned over to the treasury and costs paid by it. In a number of the states this system now prevails in whole or part of the forest area.—*W. N. Sparhawk*.

417. EBERTS. Die Lohnbewegung im forstlichen Betriebe. [The wage agitation in the forest industry.] Forstwiss. Centralbl. 41: 201-210. 1919.—Following the Revolution, the introduction of the eight-hour day has been accompanied by insistent demand for higher wages in all branches of industry, which have finally gone far beyond the level justified in the increased cost of living. The expectation that with the return of millions of soldiers wages would come down has not been fulfilled, but rather the opposite. The unemployment allotments have resulted in demoralization of the workers, who prefer to congregate in the cities and do nothing (there were 170,000 unemployed men in Berlin in January, 1919) than to work at agriculture or forestry in the rural districts where there is a great shortage of laborers. The eight-hour day is not suited to either of these industries, because of the irregular nature of the work. Particularly in forestry, is the piece-work system desirable, since it allows the peasant to work in close proximity to his dwelling, at times which suit his convenience and do not interfere with his work on his farm. The Government plans to take steps to educate the workers to realize that unduly high wages will have most serious results on the working classes themselves. In case of forest laborers this will be accomplished through the workmen's councils which are to be chosen in each Oberforsterei by the year-long employees. High wages in forest industries will result in high wood prices, which will react on many other industries. The great housing shortage is not being met by new building because of high cost of labor and material. A workman's 3 or 4 room house which could be built for 4500 marks and rented for 300 marks per annum before the war, now costs at least 12,000 marks and rents for 900 marks. Because of higher cost of mine timbers, coal costs more, and the high price and shortage of coal has brought fuelwood to two or three times its pre-war price. All of this affects the working classes more than anyone else.—*W. N. Sparhawk*.

418. EKLÖF, C. E. Tjädalens anläggning och skotsel. [The preparation and care of a tar pit.] Skogen 6: 189-210. Fig. 1-12. 1919.—The process of extracting tar from pine stumps is described in considerable detail. The yield is from 20 to 30 liters of tar per cubic meter of wood. Charcoal is obtained as a by-product in amount equaling 5 or 10 per cent of the original volume of the wood.—*G. A. Pearson*.

419. ENGLER, ARNOLD. Tropismen und excentrisches Dickenwachstum der Bäume. Ein Beitrag zur Physiologie und Morphologie der Holzgewächse. [Tropisms and eccentric thickening in trees. A contribution to the physiology and morphology of woody plants.] Preisschr. Stiftung Schnyder von Wartensee 21: 1-106. 14 pl., 16 fig. Beer and Co.: Zürich, 1918.—See Bot. Absts. 3, Entry 691.

420. EULEFELD. *Zahlen-Nachweisung aus dem Privatwald.* [Numerical evidence from a private forest.] *Forstwiss. Centralbl.* 41: 53-57. 1919.—The assertion frequently made that German forests were greatly overcut during the war is not generally true. The writer cites the records for a forest under his charge, comprising 12,000 hectares, about half softwood and half hardwoods, with a stock of more than 3,300,000 cubic meters of wood and an annual cut of about 90,000 cubic meters. The actual cut during each of the four years 1915 to 1918 was less than that provided by the working plan. A table shows the annual cut for every year since 1899, and for single years as far back as 1577.—*W. N. Sparhawk.*

421. FABRICIUS. [Rev. of: KUBELKA, AUGUST. *Moderne Forstwirtschaft.* (Modern forest management.) Vienna and Leipzig, 1918.] *Forstwiss. Centralbl.* 41: 148-152. 1919.—Kubelka develops a "Femelstreifenschlag" (selection strip cutting), different from the system described by him under the same name in 1912, which was really only a slightly modified form of Wagner's "Blendersaumschlag" (selection border cutting). Under the new system, the whole stand is first subjected to a preparatory cutting, then the stands are laid off in strips from 30 to 50 meters wide (height of trees) running at right angles to the direction of reproduction. In every fourth strip large and small holes are cut clean, varying from a diameter equal to the height of the trees, down to half that. The other strips are undisturbed, except for the preparatory cutting. Later the middle remaining strips are treated in the same way, then the others. As soon as reproduction is established in the openings, they are gradually enlarged. Depending on the period allowed for reproduction, the stand can be made into a practically even-aged one, or into a conglomeration of small even-aged stands varying from each other by 60 years.—The reviewer questions some of Kubelka's conclusions as to the efficacy of his method, such as: that insect damage is greatly reduced; that danger from storms is little greater than in virgin forest. Kubelka recommended the method for general application under all conditions in the forests of central Europe, although he has only tried it on a few private forests for 6 years or less, and the high yields in material and money which he claims were the result of the methods he seeks to change. It is doubtful whether at this time Europe is in condition to suffer the loss in forest production which must result from transforming existing forests into small broken-up stands.—*W. N. Sparhawk.*

422. FANKHAUSER, F. *Zur Kenntnis der Lärche.* [Facts about the larch tree.] *Zeitschr. Forst- u. Jagdw.* 51: 289-297. Pl. 1-3. 1919.—A discussion regarding the factors governing the distribution of the larch (*Larix*) in the Swiss Alps. It is an erroneous supposition that larch requires a deep soil, for in the Swiss Alps it also grows on rocky, shallow soiled cliffs. Its chief requirement is a fresh soil which must however have a good and constant supply of moisture. Lacking this, the larch is apt to perish. It is the heaviest water transpirer of all the conifers, in Switzerland. In support of this assertion the morphological characters are noted and also the fact that the larch is the only conifer which sheds its needles (in order to reduce water loss). Observations show that in periods of drought the larch survives by shedding its needles where other conifers perished. Attention is called to fact that, owing to differences in densities of crowns, various varieties of larch have been (probably erroneously) described. The distinctions are probably based on differences in moisture content of sites. For instance, the larch forms a very compact crown where it grows on deep and well watered soils, while on dry sites (e.g., south exposures), the crown becomes very open and pointed (see plates illustrating differences). Where the larch grows in mixture with other trees it succeeds only so long as there is sufficient, and constant water available. Hence it does poorly in mixture with spruce or fir, whose crowns prevent rain water from falling readily to the surface soil. In mixture with beech on the other hand, larch does well, for, during the winter, rainwater is readily admitted to the soil, through the open crowned beech, and in the summer a greater amount of precipitation is allowed to drop to the ground along the branches and stems of the beech. Moreover, the shed leaves of the beech form a protective covering, thus conserving surface moisture. Much has been written concerning the light requirements of the larch but it seems apparent that moisture is the controlling factor.—*Hermann Krauch.*

423. FERNALD, M. L. Lithological factors limiting the range of *Pinus Banksiana* and *Thuja occidentalis*. *Rhodora* 21: 41-67. 1 fig. March, 1919.—Bot. Absts. 4, Entry 283.

424. FISCHER, E. Neuere über die Rostkrankheiten der forstlich wichtigsten Nadelhölzer der Schweiz. [Recent information about important rusts of conifers of Switzerland.] *Schweiz. Zeitschr. Forstw.* 49: 113-120. 1918.—See Bot. Absts. 3, Entry 713.

425. FRIEDRICH, OSCAR V. Undersökning över feta koniferoljor. [Investigations of fatty conifer oils.] I. Undersökning av tallfröolja. [Investigations of pine seed oil—*Pinus silvestris* L.] *Svensk Farm. Tidskr.* 23: 445-451, 461-463. 1919.—The author investigated the fatty oil content of the Swedish grown *Pinus silvestris* L. and includes a table for comparison of the physical properties of these oils with those reported by Grimme in Germany and DeNegri and Fabris in Italy.—The fatty oils described in this paper consist of volatile and nonvolatile fatty acids (both saturated and nonsaturated), glycerine and a phytosterin. The nonvolatile fatty acids compose 90.4, the volatile 0.11, the glycerine 7.5 and the raw phytosterin 1.29 per cent of the fatty oils. Of the fatty acids 3 per cent are solid, and 97 per cent fluid. The solid fatty acids consist of 5 per cent Stearic and 95 per cent Palmitic. In the case of the unsaturated fatty acids 36.2 per cent is Oleic, 56.2 per cent Linolic, and 7.6 per cent Linolenic acid. The undistilled residue is a phytosterin which is presumably sitosterin.—A. M. Hjort.

426. FRIEDRICH, OSCAR V. Undersökningar över feta koniferoljor. [Investigations of fatty conifer oils.] II. Undersökning av granfröolja. [Investigation of spruce-seed oil—*Picea abies* Karsten.] *Svensk Farm. Tidskr.* 23: 500-505. 1919.—The author investigated the fatty oil content of the seeds of Swedish grown spruce—*Picea abies* Karsten, and includes in this paper a table comparing the results he obtained, pertaining to the physical properties, with those reported by Grimme in Germany and DeNegri and Fabris in Italy.—The fatty oils consist of volatile and nonvolatile fatty acids, both saturated and unsaturated; glycerine and raw phytosterin. The nonvolatile fatty acids comprise 91.6 per cent, the volatile (Butyric acid) 0.14 per cent, the glycerine 7.5 per cent and the raw phytosterin 1.37 per cent of the fatty oils.—The nonvolatile fatty acids consist of 0.70 per cent saturated and 99.3 per cent unsaturated acids. Of the saturated fatty acids palmitic acid is the only one present. Of the unsaturated fatty acids 42.75 per cent is Oleic, 49.55 per cent Linolic and 7.7 per cent Linolenic acid.—The undistilled residue consists of a phytosterin which is presumably identical with sitosterin.—A. M. Hjort.

427. FULLER, GEORGE D. Our national forests. [Rev. of: BOERKER, RICHARD H. D. *Our national forests*. 238 p. 80 fig. Macmillan Co.: New York, 1918. (See Bot. Absts. 2, Entry 917.)] *Bot. Gaz.* 67: 369-370. 1919.—The author "has collected and organized a mass of scattered data and presented them in very readable form." The timeliness of the book is noteworthy, as we are just entering upon a period of appreciation of our forest wealth. Weaknesses of the book are seen in the absence of a bibliography or of a suitable index.—H. C. Cowles.

428. GEETE, ERIK. Sägkamraten. [A saw-companion.] *Skogen* 6: 142-145. Fig. 1-6. 1919.—Description of a device for assisting in the operation of a one-man saw. It consists of a large coil spring, one end of which is attached to the tree and the other to the back of the saw. When the saw is drawn toward the operator the spring is stretched out; when the pull is relaxed the spring recoils and pulls the saw back on the reverse stroke.—G. A. Pearson.

429. GIRARD, E. Notes sur la culture de l'Hévéa en Cochinchine. [Notes on the cultivation of Hevea in Cochinchina.] *Bull. Agric. Inst. Sci. Saigon* 10: 289-299. 1919.

430. GRAVES, H. S. A policy of forestry for the nation. *Amer. Forestry* 25: 1401-1404. 1919.—A statement, more comprehensive than heretofore made by the writer, setting forth the objectives of a national forest policy and the steps to be taken to attain them.—Chas. H. Otis.

431. GREELEY, W. B. The forest code and the regime forestier. Amer. Forestry 25: 1451-1457. 6 fig. 1919.—The writer considers the historical development of the "regime forestier," defined as the sum total of laws and administrative decrees applicable to forests under all forms of public ownership, and which is applied today to about one-third the total forested area of France. Typical forestry practice under these laws is described in some detail.—*Chas. H. Otis.*

432. GREELEY, W. B. The forest policy of France—its vindication. Amer. Forest. 25: 1379-1385, 1424. 8 fig. 1919.—A picture of French forestry in the broad,—its historical setting, the national conceptions which it expresses and what it has accomplished.—*Chas. H. Otis.*

433. GRONDAL, B. L. The seasoning of lumber. Sci. Amer. Supplem. 87: 158-160. 1919. [From the West Coast Lumberman.]

434. HERTZ. Staatsaufsicht für den Privatwald [Governmental supervision of private forests.] Zeitsch. Forst- u. Jagdwirtschaft. 51: 177-183. 1919.—A plea for the extension and retention of private forests in Germany, but that same be placed under government supervision. Writer claims that state owned forests are less well managed than private tracts. Private ownership tends to stimulate greater diversification in methods and kinds of timber grown. Hence the most intensive use of the various forest sites is accomplished. This is not generally the case with state owned forests. Private ownership also promotes personal thrift and thus is an asset that proves to be of utmost value in times of financial stress. After elaborating on the advantages of private owned forests the writer outlines a plan of governmental control which he believes will result in good management yet not interfere materially with the desires of the owner.—*Hermann Krauch.*

435. HOLLICK, A. The story of the Bartram oak. Sci. Amer. 121: 422, 429-430, 432. 6 fig. 1919.—See Bot. Absts. 4, Entry 615.

436. ILLICK, J. S. Use the dead and dying chestnut. Sci. Amer. Supplem. 88: 252-253. 7 fig. 1919.—Considers the importance of immediately salvaging, into various building materials and forest products, of trees killed by fungus growth.—*Chas. H. Otis.*

437. ILLICK, J. S. When trees grow. Amer. Forestry 25: 1386-1390. 9 fig., 2 tables. 1919.—Based on data obtained in the vicinity of Mont Alto, Pa., the writer states that most of the native and introduced forest trees make 90 per cent of their height growth in less than 40 days. Growth begins slowly, after a variable period rises rapidly, then reaches a maximum which is maintained for a short time, finally falls gradually to a minimum and then ceases completely. Actual growth, however, progresses by leaps and bounds, alternating with rest periods, which may be of long or short duration. It is believed that the recurring rest periods may become a rather fixed and regular feature of the growth of certain species, as is noted for pitch pine. The rate of tree growth not only fluctuates throughout the growing season, but also during each day. About twenty trees of each of four species showed that the rate of growth at night was about twice that during the day.—*Chas. H. Otis.*

438. JENTSCH, F. Wald und Waldwirtschaft in Belgien. [The forests and forest management in Belgium.] Tharandter Forst. Jahrb. 70: 111-130. 1919.—A rather detailed description of Belgium forests by a German forester who was in that country during the period of occupation. Belgium was originally heavily forested from the river Scheldt to the Ardennes mountains. The extent became gradually diminished through settlement. Deforestation was, however, carried too far, with the result that a great deal of desert land exists to-day, considering such a thickly settled country as Belgium. The fertile portions of north-western Belgium are almost devoid of forests and near the manufacturing centers a poor stand exists. The hilly, south-east portion of the country is, however, quite heavily forested. Altogether, Belgium has about 18 per cent of forested land. Greatest percentage is in Namur (31 per cent) and in Luxemburg (41 per cent). Detailed descriptions of the geological formations and cor-

responding forest types are given. In discussing the management of Belgian forests author points out that the greater part are private and communal. Accordingly, the forests are said not to have been managed so as to yield the highest possible returns.—*Hermann Krauch*.

439. KLEBAHN, H. *Peridermium pini* (Willd.) Kleb. und seiner Uebertragung von Kiefer zu Kiefer. [P. pini and its passage from pine to pine.] *Flora* 111-112: 194-207. Pl. 4-5. 1918. —See Bot. Absts. 3, Entry 774.

440. KORDVAHR. Gedanken über Zweck und Ziel der Forstwirtschaft. [Notes on the purpose and goal of forestry.] *Zeitschr. Forst- u. Jagdwirtsch.* 51: 1-6. 1919.

441. KORDVAHR. Der Wert von Waldbeständen. [Forest valuation.] *Zeitschr. Forst- u. Jagdwirtsch.* 51: 140-144. 1919.—A discussion of the factors governing forest valuation. Several formulas are cited.—*Hermann Krauch*.

442. KRUEHOFER. Die Entwicklung der Forstwirtschaft und des Holzhandels in Elsass-Lothringen. [Development of forestry and the wood industry in Alsace-Lorraine.] *Forstwiss. Centralbl.* 41: 57-65, 101-109. 1919.—The forests of Alsace-Lorraine cover 443,451 hectares, of which 138,869 hectares belong to the State. The total annual cut of wood is about 2,000,000 cubic meters. Under the former French control the forests were managed mostly on the selection system, transportation was not developed, and timber was sold on the stump, so that there was a tendency toward monopoly of each unit and lower prices for stumpage than the market justified. The Germans changed this by selling the logs, with the result that there were more bidders and better prices, and numerous local wood-using industries sprang up near the forests. Roads were developed. A high-forest system, with reproduction cuttings, was substituted for the selection system except in the higher Vosges. Spruce and pine, and recently larch and Douglas fir have been introduced in the predominant silver fir stands. 250,000 hectares, three-fourths of it in Alsace, are managed as high forest; 150,000 hectares as coppice-with-standards, and small areas as coppice, tanbark forest, etc. Of the high forest, one-third is silver fir, nearly one-third beech, one-sixth pine, and one-eighth oak. Fir predominates in the Vosges, while pine is in the valleys and foothills; beech is most abundant in the foothills, and oak often predominates in the lowlands. The forests of the Lothringian plateau are almost exclusively hardwoods. The fir grows rapidly, yielding 5 cubic meters per hectare per year, and can yield 7 cubic meters if thinned properly. The wood is used for local needs and the surplus goes down the Rhine. Because of the knotty material produced under the former selection management, it is inferior to the fir from the Black Forest, so unable to compete with it. Beech, formerly chiefly valuable for firewood, has lately found a ready market for railroad ties, while the thinnings bring good prices for fuel. Pine is used chiefly for mine timbers. Oak, formerly managed as coppice-with-standards, is now almost all high forest, and is left standing through two rotations of beech. When the underwood is cut out, the oak standards are trimmed to a height of at least 6 meters, in order to produce clear lumber. Under the German regime, one-fourth of the possible cut each year was reserved to be cut only in emergencies, so that there is now a large surplus of mature timber, especially in the fir districts. There was a considerable export of sawed lumber to France until it was stopped by high import duties in 1895, since when most of the French trade was in unmanufactured wood, chiefly pulp. The demand for long timbers and large sizes, from Belgium, Holland, and Luxemburg, made up for the loss of the French trade.—*W. N. Sparhawk*.

443. LANE-POOLE, C. E. Report of the Woods and Forests Department for the year ended 30th of June, 1919. *Ann. Progress Rept. Forests Dept. Western Australia.* 26 p. Perth, 1919.—The work of the Department for the period reported upon is briefly summarized under the following captions: "Classification of Forests, Purchases, Forest Work, Forest Fires, Forest Ranging and Timber Inspecting, Plantation and Nursery Work, Timber Industry, Shipbuilding, Revenue and Expenditure, Botanical, Tan Barks, Commonwealth Forest Products Laboratory, Sandalwood, Legislation, and Publications." Through lack of adequate staff and funds the Department continued purely as a revenue-collecting organization. With-

out trained foresters the Conservator of Forests states that it is impossible to initiate the required silvicultural work. A noteworthy feature of the report is the announcement of the decision to establish a Forest Products Laboratory in Western Australia which will depend on the Federal Government for its funds. The depression of the lumber industry which obtained during the war still existed due to the shortage of ships. The report is appended by detailed statements of revenue and expenditures, timber statistics, a list of herbarium specimens collected and identified, a list of trees raised and planted at the Hamel state nursery and particulars of prosecutions during the year.—*C. F. Korstian.*

444. LEGAT, C. E. Forestry in the Union. *South African Jour. Indust.* 2: 685-687. 1919.

445. LEOPOLD, A. Destroying female trees. *Amer. Forestry* 25: 1479-1480. 1 fig. 1919.—After nearly twenty-five years of argument and discussion, the City Commission of Albuquerque, New Mexico, has ordered the cutting down of all female cottonwood trees within the city limits, a ten-year cutting plan having been adopted.—*Chas. H. Otis.*

446. LINDBERG, FERD. Bredsådd. [Broadcast sowing.] *Skogen* 6: 108-111. Fig. 1-5. 1919.—Broadcast sowing succeeds well after a fire, where the ground has been prepared, and in drained swamps. Even on unburned ground success is usually assured if the ground is prepared by cultivation. Without soil preparation the amount of seed required is so great as to more than offset the cost of cultivation.—*G. A. Pearson.*

447. LINDBERG, FERD. Exempel på flertoppighet hos planterade barrträdsplanter. [Examples of forking in planted conifers.] *Skogen* 6: 211. 1919.—A survey of several pine plantations showed the percentage of forked plants to be as follows: Single leader, 77 per cent; two leaders, 15 per cent; three leaders, 4 per cent; more than three leaders, 4 per cent. The plantations were established from 1909 to 1913.—*G. A. Pearson.*

448. MAHOOD, S. A., AND D. E. CABLE. Reaction products of alkali-sawdust fusion: acetic, formic, and oxalic acids and methyl alcohol. *Jour. Indust. Eng. Chem.* 11: 691-695. 1919.—The data show that 17 to 20 per cent of acetic acid can be obtained from hardwood sawdust by fusion with sodium hydroxide and that a simultaneous production of oxalic acid amounting to approximately 50 per cent of the dry wood is obtained. At lower temperatures, both formic and acetic acid are produced, amounting to approximately 15 per cent each. If the reaction is carried out in a closed vessel, the production of 2.4 per cent of methyl alcohol results.—*Henry Schmitz.*

449. MARTIN, H. Die Erhaltung der Buche in Sachsen, insbesondere in gemischten Beständen. [The maintenance of the beech tree in Saxony, especially in relation to mixed stands.] *Tharandter Forst. Jahrb.* 70: 83-110. 1919.—Article is conclusion of a series discussing the value of beech in mixture with various conifers. Methods of regeneration and results are given in considerable detail. Series concludes with emphasis on fact that beech has played a far greater rôle in the improvement of forest stands of Saxony than is generally perceived.—*Hermann Krauch.*

450. MAXWELL, HU. The uses of wood. Floors made of wood. *Amer. Forestry* 25. 1343-1349. 10 fig. 1919.

451. MAYER, KARL. Die Rotfäule. [The red-rot.] *Forstwiss. Centralbl.* 41: 121-127. 185-195. 1919.—Discusses red rot (*Trametes radiciperda*) on spruce near Schongau. This is a morainal region, with the tertiary sublayer exposed along canyons, and with considerable areas of high moor between the moraines. The morainal deposits weather into a fresh sandy loam, which with the heavy precipitation (1250 mm.) is very favorable to forest growth. Where the loam is shallow or cut off by clay at a depth of 10 cm. moors are likely to form. The best timber is on the "hard" soils, while that on the "soft" (moor) soils is not as good. Spruce comprises 95 per cent of the stand, associated with beech and fir on the "hard" soils and with alder and birch on the "soft" soils. Mayer disagrees with Sauer's theory that red

rot was favored by removal of the beech from the spruce stands, and that pole-stands now heavily infested were formerly healthy stands of spruce. He says the rot was always present, but not noticed until wood prices became high, and besides there is as much beech in the mixture as there ever was, or even more. Figures show more rot on sites where beech or other hardwood species are present, than in pure spruce stands. Statistics of rot per cent in conifers cut during 6 years (1912-1917) show a gradual decrease in per cent of rot from 14.4 in 1912 to 10.6 in 1917, due probably to the institution in 1908 of a system of thinnings which take out old defective trees as well as young trees. Then too, the practice of bringing the wood out to roadsides in winter eliminates much of the root injury which formerly occurred. In general, per cent of rot increases with decrease in soil-moisture; the average for "hard" soils was 12.7 per cent, and for "soft" soils 7.1 per cent. Contrary to Sauer's assertion, boggy sites are not especially liable to infection, nor do the figures show rot to be any worse in the first rotation on reforested land which had been used for agriculture. Spruce roots develop very differently on "soft" and on "hard" soils. On moors, the root mass is barely 20 cm. thick and covers 30 square meters or more, with numerous root masses at the periphery, called "paws" (Tätzen) by wood-choppers. These are not due to the presence of beech, since they are common where there is no beech, but are caused by soil conditions. Neither is the dying off of the older roots of spruce retarded by the presence of beech. Whether *Trametes* is at all responsible is a question. As far as known, the fungus never directly kills a spruce, even though it may have been infected for many years. Red rot probably seldom attacks perfectly healthy trees, but may get in through root injuries caused by wind-stresses, hoofs of cattle, and especially by hauling out logs during the growing season. Red rot causes loss, not by killing the tree or retarding growth, but because of the degrading of the infected wood. In 1917, out of a total cut of about 10,500 cubic meters, 1120 was more or less rotten and sold for less than half of what it would have brought if sound. It will hardly be wise to try to check rot by introducing beech in spruce stands until certain that that will help, because to do so will involve heavy thinnings and a considerably lower yield per acre.—*W. N. Sparhawk.*

452. MIYOSHI, MANABU. Über der Erhaltung einer neuen wildwachsenden hängenden Varietät des Kastanienbaumes als Naturdenkmal. [Concerning a new wild chestnut with weeping branches and its preservation as a natural monument.] *Bot. Mag. Tokyo* 33: 185-188. 1 photo. Sept., 1919.—Describes a new variety of chestnut with weeping branches (*Castanea sativa* Mill. var. *pendula* nov. var.) growing in two localities in the province of Shinano, Japan. Seedlings derived from the older trees show same habit, from which author infers this is a heritable character. The older trees are more than a century old and 3.5 meters in circumference. It is proposed to preserve these two groves as national monuments.—*L. L. Burlingame.*

453. MÜLLER, D. Die Eiche als Mischholz der Buche im preussischen Solling. [Oak in mixture with beech in Prussian Solling.] *Zeitschr. Forst- u. Jagdw.* 51: 301-307. 1919.—A discussion regarding the advantages and disadvantages of growing beech in mixture with oak. It is necessary to keep oak as an upper story otherwise it will become suppressed by the beech. The mixture succeeds best on warm, sunny sites. On north and east exposures, where beech thrives best, it is difficult to keep the oak in the lead. Different methods of regeneration are described with examples of results obtained. It is found, for instance, that the sudden removal of a beech understory is apt to cause the development of adventitious buds and sprouts on the oak—also stagheadedness. Since it is important to keep the oak as an upper story it is sometimes practical to plant oak seedlings before beech has seeded up an area by natural regeneration. Experience shows however that this method can only be attempted after other vegetation has sprung up in luxuriant form so as to hide the planted oak from deer and other animals, which are otherwise sure to cause severe damage. The use of different species or varieties of oak in mixture with beech is discussed.—*Hermann Krauch.*

454. NELSON, J. C. Deam's trees of Indiana. [Rev. of: DEAM, CHAS. C. The trees of Indiana. State Bd. Forest. Indiana Bull. 30. 299 p. Mar., 1919.] *Rhodora* 21: 188-191. 1919.—An extensive review of the paper cited.—*James P. Poole.*

455. PACK, C. L. Central Park trees starving to death. Amer. Forestry 25: 1391-1400. 80 fig. 1919.—Of some 60,000 trees in Central Park, New York City, 4000 or more have died since 1917, chiefly during the severe winter of 1917-1918. The trees which died would, in the large majority, have withstood the winter had they not been weakened by long years of malnutrition. Of the 3000 dead trees removed in the last 2 years, the greater number were Oriental plane trees; next in number of dead were the elms; third came the oaks and Lombardy poplars; fourth, the lindens; and last, the maples and several other species. The conditions which have led to the death of these trees and the poor condition of others are (1) shallow soil, heavy impermeable clay and hard packing of soil around trees and (2) unfavorable meteorological conditions (there has been a decided decrease in rainfall in the last 20 years, and much of this decrease has been in the summer months when needed most; there has been a decided decrease in relative humidity in the past 5 years, coupled with an increase in the wind movement during the same period; and the trees were subjected to a very severe frost in the winter of 1917-1918).—Chas. H. Otis.

456. PATTON, R. T. Timber production and growth curves in the mountain ash [*Eucalyptus regnans*.] Proc. Roy. Soc. Victoria. 30¹: 1-3. Pl. I-II, fig. 1-4. 1917. [Received 1919.] —Studies of the annual rings of logs were made at Powelltown. The timber was considered to be over ripe and many trees showed incipient decay in the heart. It was generally possible to distinguish clearly 80 annual rings. The outer rings beyond these were narrow and less clear, although in one case 125 rings were counted. It was concluded that the tree reached its prime well under 100 years. A remarkable trunk expansion occurred during the first 10 years. The ring width from decade averages for the whole period was shown to decline steadily, probably partly due to overcrowding. Less variation in ring width occurred after the 30th year. The increase in diameter of trees, indicated by decade averages, was so regular (curve) that age could be closely estimated from it. If x represented the age of the tree and y represented the diameter in inches, then $3\sqrt{x}=y$ approximately. The amount of wood produced during the second decade of growth was twice that for the first. The maximum growth occurred in the 5th decade, after the 40th and before the 50th year. The minimum was not fully established. Although the tree reaches maturity (maximum growth) at about 50 years it is not then fit for milling. The growth for the next 10 to 20 years would be, under the local conditions, profitable financially if the crowns remained vigorous because the wood would mature and improve by ripening. In a tree still healthy at 80 years, heart rot was not to be feared. It was found that young trees were not attacked by mistletoe. The decrease in vigor, indicated by the rings and the paucity of foliage, which generally occurred after 70 years, marked a loss of vitality which was thought to make the tree subject to attacks of all kinds.—Eloise Gerry.

457. PETRASCHKE, KARL. Einiges über die angewandte Entomologie in Amerika und ihren Einfluss auf die entomologischen Reformbestrebungen in Deutschland und Deutsch-Österreich. [Notes on applied entomology in America and its influence on the movement for entomological reform in Germany and German Austria.] Forstwiss. Centralbl. 41: 161-173. 1919. —The biological method of combating insect pests (by favoring the development of their natural enemies) was first suggested to the author in connection with ravages of the gypsy (*Lymantria dispar* L.) and brown-tail moths (*Euproctis chrysorrhoea* L.) and the oak caterpillar (*Cnethocampa processiona* L.) on the south slopes of the Transylvanian Alps in Roumania in 1887, and in Croato-Slavonia and Bosnia in 1889. This method has been developed on an extensive scale in the United States, under the leadership of the Bureau of Entomology (a number of instances are given) and other methods have also been widely studied, especially the use of chemicals. The success of American entomologists in this work, which requires a very thorough detailed knowledge of the insects, their life habits, and their enemies, is attributed to their capacity for going deeply and thoroughly into a study and to their adaptation to observational investigation of practical value, but primarily to the organization of entomological research activity, with its division of work among specialists, and its centralization or correlation by a central agency at Washington.—Prof. Escherich has been striving for de-

velopment along similar lines in Germany, through his Society for Applied Entomology and his *Zeitschrift für Angewandte Entomologie*, and has laid the beginnings of a Research Institute in Munich, to study methods of combating insect pests injurious to farms, forests, and farm and forest products and articles made from them, as well as to domestic animals and human beings. The Institute is to be exclusively for research, not for instruction, but is to publish its results in language that can be understood by practical farmers, foresters, and manufacturers.—Escherich emphasized the necessity of a universal application of control measures—no use to control a pest on one area and not on the adjacent one—but prefers to accomplish this through education of the public rather than forcibly through laws. This can be done through teachers of winter short-courses, through traveling teachers, and through technically and practically trained insect-pest inspectors who shall keep posted on the development of the science and pass their knowledge on by means of demonstrations and otherwise. There is perhaps not much hope of making the older generation receptive to such educational propaganda, but much can be done with the coming generation, particularly if elementary instruction regarding the principal beneficial and noxious insects can be given in the public schools.—Dr. Seitner is pushing the development of a similar scheme in German Austria. He suggests a central office, well furnished with equipment and trained personnel, and state entomologists or traveling inspectors to collect information and statistics and carry on control work.—*W. N. Sparhawk.*

458. PRATT, M. B. The glory of the redwoods threatened by fire. *Amer. Forestry* 25: 1443-1445. 4 fig. 1919.—An account of the fires of the summer of 1919, which are said to have been the largest in southern California since 1910. There occurred the first fire in Redwood Park in modern history. One hundred redwoods were destroyed. The big redwoods do not burn readily, but become weakened by brush fires about their bases and finally topple over with a great crash, carrying smaller trees with them. Many of the redwoods had been hollowed by previous fires four hundred or five hundred years ago, and so fell more readily before the flames.—*Chas. H. Otis.*

459. RECORD, S. J. *Lignum-vitae*, the vital wood. *Sci. Amer. Supplem.* 88: 4-5, 15-16. 6 fig. 1919.—The propeller shaft of every large steamship revolves in wooden bearings. *Lignum-vitae*, of the genus *Guaicum*, is the only wood suitable for such bearings, and this is due to certain peculiar properties of the wood. The density of the wood enables it to withstand enormous loads; the interwoven fibers keep it from splitting and tearing apart under impact; the infiltrated resin acts as a lubricant, preventing friction and eliminating the danger of an overheated bearing, besides serving to protect the wood from the softening effect of water. Besides this most important use of *lignum-vitae* for stern bearings, the wood is used for bowling balls, rollers for furniture casters, mallets, sheaves of pulleys, railroad ties, grate fuel and numerous small uses. The sawdust is in demand by the drug trade. Cuban *lignum-vitae* logs are mostly 4 to 8 feet long, with diameters of 6 to 24 inches, and are of good quality. The *lignum-vitae* from Jamaica, Bahama Islands and Porto Rico is small, usually not exceeding 5 inches in diameter, and is of good quality. Santo Domingo, Haiti and Nicaragua supply considerable amounts of *lignum-vitae*. Mexico furnishes but a small amount at the present time. The West Indies will probably continue to supply the bulk of the high-grade *lignum-vitae* for many years if prices remain at sufficiently high levels to warrant the increased expense attending the more and more difficult logging. Substitutes for *lignum-vitae* have been suggested and tried for stern bearings and other exacting uses, but nothing acceptable has been found.—*Chas. H. Otis.*

460. RILEY, S. Prevention of forest fire losses. *Amer. Forestry* 25: 1260-1263. 7 fig. 1919.

461. RONGE, ERIC W. Grafiska utbytestabläer. Enkel metod för upprättandet av en praktiskt nöjaktig utbytestablä. [A graphic method of constructing volume tables.] *Skogen* 6: 69-84. Fig. 1-15. 1919. It is established that each "form class" in trees has a corresponding proportional "taper series" between breast-height and the top of the tree. Thus,

for example, all trees, regardless of height, falling in the "form class" 0.65 taper off as follows: at points 10, 20, 30, 40, 50, etc., per cent of the length of the stem above breast-height, the stem diameters are 94, 88, 81, 73, 65, etc., per cent, respectively, of the diameter at breast-height. The "form class series" varies for different species, due primarily to differences in the development of the crown and consequent differences in the resultant strain produced on the trunk by the wind. For the same species, however, the "form class series" is practically constant over a wide range of conditions. Thus, having determined the points on the bole at which the various inch diameters fall in average trees of given diameter and height, graphs can be prepared showing the average taper and volume of the trees in any stand where the average heights of the various diameter classes are known.—*G. A. Pearson.*

462. RUPP, G. Tabak-Ersatzmittel. [Tobacco substitutes.] Zeitschr. Untersuch. Nahrung-u. Genussmittel 37: 370-377. 1919.—See Bot. Absts. 4, Entry 121.

463. SAMMEREYER, H. Waldschutz. [Forest protection.] Oesterreich. Forst- u. Jagdzeitg. 1924: 302. Nov., 1919.—Under conditions following the war the necessity of forest protection in Austria has become acute. The author proposes a popular association (Völkerbund) composed of all classes of society including urban as well as rural representatives to secure recognition of the necessity of forest conservation and protection.—*F. S. Baker.*

464. SCALIONE, C. C., AND D. R. MERRILL. The tannin content of redwood. Jour. Indust. Eng. Chem. 11: 643-644. 1919.—Heartwood of redwood contains 12.2 per cent of tannin with the A. L. C. A. hide powder method. Sapwood and bark contain very little tannin.—*Henry Schmitz.*

465. SCHRAGE. Aus dem Leben verkannter Tiere. [On the life and habits of misunderstood animals.] Zeitschr. Forst- u. Jagdw. 51: 190-201. 1919.—Article deals with the life history of the mole. It was long believed that the mole was a beneficial animal in that he was supposed to eat the grub of the May beetle which is so destructive to forest tree seedlings. Accordingly the mole was introduced in regions where the beetle was doing much damage. But no beneficial results were obtained.—Investigations were therefore conducted to determine if the mole really did eat beetle grubs. Feeding experiments conducted on captured moles proved that they do not eat the grubs but subsist rather on angle worms. The moles refused to eat grubs even when almost starved. To protect the mole because he is supposed to be an aid to the forester and farmer is therefore a false opinion.—*Hermann Krauch.*

466. SCHRODER. Bodenpflege durch Reisigdeckung. [Soil maintenance by means of scattering brush.] Deutsch. Forstzeitg. 34: 162-163. 1919.—Removal of leaf-litter under stands of hardwood species (beech oak, ash), either by erosion, by wind, or otherwise, results in a hardening of the surface soil (especially on heavy soils) which is usually soon covered with a matted vegetation of Polytrichum or other moss. These conditions seriously affect the growth of the forest. To hold the leaf-litter in place, the smaller branches resulting from logging operations were scattered over the ground. Examination 6 years later showed a heavy cover of leaves, no moss, and surface soil free from crust, in sharp contrast to nearby areas not so treated.—*W. N. Sparhawk.*

467. SCHWAPPACH, A. Neure Untersuchungen über den Wachstumsgang der Schwarzerlen-Bestände. [New investigations concerning the growth and yield of black alder.] Zeitschr. Forst-u. Jagdw. 51: 184-190. 1919.—A detailed citation, (with tables) of the changes in yield from the period 1902 to 1918.—*Hermann Krauch.*

468. SCHWAPPACH. [Rev. of: Denkschrift, betreffend die Hedung und Sicherung der forstlichen Rohproduction in Oesterreich nach dem Kriege. [Memoir on increasing and assuring the forest production in Austria after the war.] Zentralbl. Gesamte Forstw. 1918: 236.] Forst. Rundschau 20: 9-12. 1919.—Summary of 15 points presented to the Minister of Agriculture (Austria) by the directors of the Austrian Forest Association, covering recommen-

dations on reforestation, improved forest engineering, recognition of importance of small private forest holdings, better education for foresters and forest investigations particularly in lines of silviculture, utilization, seed studies, and smoke damage.—*F. S. Baker.*

469. SCHWAPPACH. [Rev. of: 8 papers on forest education in Germany. Allgem. Forst-u. Jagdzeitg. 94: 34, 85, 86, 88, 95, 1918; Forstwiss. Zentralbl. 40: 244. 1918; Tharandter Forst. Jahrb. 69: 135, 268, 320, 321, 359. 1918.] Forst. Rundschau 20: 1-7. 1919.—The discussion centers upon the rôle of the forest colleges (forstliche Hochschulen) in the scheme of forest education, particularly in view of the reduction in the number of schools necessitated by the results of the war. The general opinion seems to be that the colleges should be abandoned as such and merged into existing academies, technical schools or universities.—*F. S. Baker.*

470. SHARPLES, P. P. Trees and the highways. Amer. Forestry 25: 1415-1416. 3 fig. 1919.

471. SHEPSTONE, H. J. Water tree of the Sudan. Sci. Amer. 121: 260, 272. 2 fig. 1919.—The Tebeldi tree or "Baobab" of the Sudan, *Adansonia digitata*, attains a height of 50 to 55 feet and an average diameter of 16 feet, maintaining the latter to a height of 25 feet or more. The trunks are by nature hollow, and they are used by the natives to store water for use in the dry season. Water thus stored remains sweet for a very long time, and even after a lapse of two years only a slight discoloration is noticeable. From the bark the inhabitants make strong and serviceable ropes. The kernels of the peculiar fruit may be crushed, mixed with water and then boiled and eaten. The age of the large trees is probably great, running into centuries.—*Chas. H. Otis.*

472. SIEBER, P. Über Holzartenwechsel. [Suggestions regarding change of species in silvicultural practice.] Allg. Forst-u. Jagdzeitg. 95: 1-6. 1919.—It has often been observed in the virgin forest that there occur periodic changes of composition amongst the various tree types. This change is ascribed to the depletion of the soil of certain elements peculiar to the species which occupy a given site for a long time—hence a change to species of different requirements follows. Since the introduction of forestry practice centuries ago, it became the aim, in most instances, of foresters to convert the mixed stands into single species forests. Now it has become apparent that this continuous cropping to one species has been detrimental and that an actual decrease in yield is resulting. The article outlines the means and methods for managing the forests so that mixed stands may be again introduced and maintained.—It is pointed out that that silvicultural system is best which makes use of the observations gathered from nature. There has been too much tendency to make the forests conform to a prescribed "system" with the result that they have deteriorated.—*Hermann Krauch.*

473. SIM, T. R. Soil erosion and conservation. South African Jour. Indust. 2: 962-968. 1919.—See Bot. Absts. 4, Entry 1686.

474. SIMMONDS, J. H. Private forestry. New Zealand Jour. Agric. 19: 152-171. 10 pl. 1919.—Several sections of the Marlborough District were studied to determine the relative values of comparatively old tree plantations in that area. The trees are considered from the standpoint of usefulness as shelter for the homestead or the farm, and general effect on the country side; value as fuel, fencing, and sawn timber; suitability for any given location; and methods of propagation. The species are listed in groups according to probable adaptability for the different types of soil and climate.—*N. J. Giddings.*

475. SKERRETT, R. G. The silkworm's formidable competitor. Sci. Amer. 121: 458. 4 fig. 1919.—Spruce pulp is the fundamental material from which viscose silk (artificial) is manufactured.—*Chas. H. Otis.*

476. TIEMANN, HARRY D. The phenomena of drying wood. Jour. Franklin Inst. 188: 27-50. Fig. 1-8. 1919.—The physical processes by which water escapes from wood in the process of drying are not discussed, but the chemical and anatomical features of the wood are

summarized. Water occurs as liquid in the cells and vessels and as imbibed or hygroscopic moisture in the walls. The latter, at the "fiber saturation point," is generally about 25-30 per cent calculated upon the dry weight of the wood. "Casehardening," which is the drying and setting of the outer cell walls before these within the wood have dried out, is a frequent phenomenon. Shrinkage is the result of the drying out of imbibed water and is about twice as much circumferentially as radially and one fiftieth as much longitudinally. Due to the special properties of wood, drying is complicated by the four factors, moisture, shrinkage, stresses and hardening and cannot be calculated simply in terms of the number of thermal units necessary to eliminate all moisture. The slow rate of transfusion of moisture, the irregular rates of shrinkage, the frequent softening of wood substance or the loss of cohesion among the fibers, at elevated temperatures, the warped condition of wood fibers, the influence of elevated temperature combined with various degrees of moisture, the brittleness of wood caused by excessive drying, and its hygroscopic character, the color changes and the collapse of cells—all these help to cause internal stresses "which are the main cause of warping, checking and honey-combing." These stresses may be temporary or permanent depending upon the "relative degree of hardening of the outer and inner fibers and the relative amounts of residual shrinkage when they become uniformly dry." The internal fibers may be pulled apart by the internal stresses, thus giving rise to "honey-combing." Casehardening generally increases with rapid drying out and is less with a slower rate, since the transfusion of moisture keeps more nearly abreast of evaporation. The stresses for "several assumed progressive conditions of casehardening and reabsorption" are analyzed in terms of the relative compressions and stretchings of the outer and the inner layers of fibers, showing that the "maximum total stresses are very apt to occur in the first stages of drying" and that "the tension inside the block is at no time as intense as on the surface."—*Ernest Shaw Reynolds*.

477. WALKER, H. C. Forest policy in Burma. *Indian Forester* 45: 173-187. 1919.

478. WATERSON, D. Vanishing forests. *Sci. Amer.* 121: 383. 1919.—A brief consideration of forest conditions in New Zealand.—*Chas. H. Otis*.

479. WATERSON, D. White pine and butter. *Sci. Amer.* 121: 372. 1919.—Describing a tub made of two thicknesses of veneer $\frac{1}{8}$ inch thick and used in New Zealand and Australia as a butter container.—*Chas. H. Otis*.

480. WATKINS, J. R. Pitch pockets and their relation to the inspection of airplane parts. *Jour. Franklin Inst.* 188: 245-253. *Fig. 1-3*. 1919.—The theories concerning the origin of resin pockets and their effects upon airplane timber are discussed. The injury to such timber varies with the size and position of the pockets, the smaller ones apparently not materially weakening the airplane parts.—*Ernest Shaw Reynolds*.

481. WEBER, H. Zur künftigen Besteuerung des Waldbesitzes. [Future taxation of forest land.] *Allg. Forst- u. Jagdzeitg.* 95: 25-32. 1919.—The war, and its results have made it necessary to levy extraordinary taxes on all forms of property and incomes. Owing to the peculiar nature of the forest as an investment it is difficult to make proper assessment of value and corresponding tax. It is extremely important however that care be taken to enact the right kind of laws governing taxation of forest property. Otherwise, great if not irreparable damage might be done as a result of overcutting in order to meet the tax demands. The writer outlines, in some detail, a system of taxation which he thinks will help to solve this important problem.—*Hermann Krauch*.

482. WEIR, JAMES R., AND ERNEST E. HUBERT. A study of the rots of western white pine. *U. S. Dept. Agric. Bull.* 799. 24 p. 1919.—See *Bot. Absts.* 4, Entry 1379.

483. WIBECK, EDVARD. Om tall- och granfrö från Norrland. [Concerning pine and spruce seed from Norrland (Sweden).] *Skogen* 6: 97-107. *Fig. 1-3*. 1919.—The importance of the source of seed for reforestation as disclosed by previous investigations and experiences is

pointed out. As a rule seed should not be taken from a region of relatively mild climate to one of more severe climate. Experimental plantations show a variation in number of good plants of from 1 per cent to 76 per cent for seed from different localities. A difference of 1°C. in mean annual temperature, or 200 meters in altitude is sufficient to show a marked effect upon the development of plants from a given lot of seed. The pine (*Pinus sylvestris*) requires a mean temperature of 10° to 11°C. from June to August inclusive to produce germinable seed. In the extreme northern range and in high altitudes this temperature is seldom attained, with the result that the forests are irregular and many-aged. The country is divided into regions according to the average germination of pine seed, which corresponds closely to the mean June-August temperature. Seed of the highest viability is produced when the mean June-August temperature is 13°C. Pine seed often shows a higher germination per cent after it has been stored 1 or 2 years. The spruce (*Picea excelsa*) produces germinable seed in a mean June-August temperature, about 1°C. lower than that required by pine. Since the spruce is relatively independent of temperature, no definite relation between viability of seed and climatic factors have been found.—*G. A. Pearson.*

484. WIMMENAUER, K. Wachstum und Ertrag der Esche. [Growth and yield of ash.] Allg. Forst- u. Jagdzeitg. 95: 9-17. 1919.—Article is one of series, to be concluded in February number of this journal. Detailed results (tables) based on sample plot investigations.—*Hermann Krauch.*

GENETICS

GEORGE H. SHULL, *Editor*

JAMES P. KELLY, *Assistant Editor*

485. ADAMETZ, L. Über Wesen und Ursprung der Domestikationsmerkmale bei Mensch und Tier. [The existence and origin of marks of domestication in man and animals.] Sitzungsber. anthropol. Ges. Wien 48: 4-9. 1918.—Author discusses the various physical and mental characteristics, largely of a degenerative nature, which tend to appear among animals under domestication and in the human race which he holds is living under similarly unnatural conditions.—*Sewall Wright.*

486. ALLEN, C. E. The basis of sex inheritance in *Sphaerocarpos*. Proc. Amer. Philos. Soc. 58: 289-316. 28 fig. 1919.—Few small counts from separately sown tetrads suggest that 2 spores of tetrad develop male, other two female gametophytes. Female shows 8 chromosomes, 1 (X) distinctly larger; male 8, 1 (Y) inconspicuous; sporophyte about 16, just 1 (X) distinctly larger. Heterotypic division not seen; homotypic shows X present in 1 spindle, absent in other. Novel mechanism, for diploid generation (asexual) is regularly heterozygous. X, due to greater bulk, brings "vigor" in female gametophyte, male being much smaller (consisting of fewer, not smaller, cells). "Quantitative theory" of sex determination is "impossible of application" in *Sphaerocarpos*, for sex individuals show no trace of opposite sex characters.—*Merle C. Coulter.*

487. ALVERDES, F. [German rev. of: BONNEVIE, KRISTINE. Polydaktyli i norske bygdeslegter. (Polydactyly in Norwegian peasantry.) Norsk Mag. f. Lægev. 6: 1-32. 1919. (See Bot. Absts. 4, Entry 3314.)] Zeitschr. indukt. Abstamm. Vererb. 22: 142-143. Jan., 1920.

488. ALVERDES, F. [German rev. of: BONNEVIE, KRISTINE. Om tvillingsfödslers arvelighet. Undersökelse över en norsk bygdeslegt. (On the inheritance of twin births. Investigations on Norwegian peasantry.) Norsk Mag. f. Lægev. 8: 1-22. 1919. (See Bot. Absts. 4, Entry 3315.)] Zeitschr. indukt. Abstamm. Vererb. 22: 143-144. Jan., 1920.

489. ANONYMOUS. Old age in perennial plants. Gard. Chron. 66: 190. Oct. 11, 1919.—Refers to the discovery of H. M. BENEDICT (Cornell Agric. Exp. Sta. Mem. 7, 1915) that the wild grape (*Vitis vulpina*) and certain other woody perennials with increasing age have correspondingly closer-meshed veins in their leaves, a condition which is regularly propagated by cuttings.—*John Belling.*

490. ANONYMOUS. **Mendelism in relation to horticulture.** Gard. Chron. 66:215. Oct. 25, 1919.—Report of a lecture by J. A. THOMSON. He stated that, through Mendelian experiments with wheat, the increased yield in India had been very great; while a value of several millions has been added to the productivity of Canada.—*John Belling.*

491. ANONYMOUS (STUDENT). **An explanation of deviations from Poisson's law in practice.** Biometrika 12:211-215. Nov., 1919.—This paper attempts to explore the general question of what effect various departures from the conditions which lead to Poisson's Law have on the resulting statistics, and especially which conditions lead to positive and which to negative binomials. It is shown by mathematical analysis that in those populations which might be expected to follow Poisson's law: (1) they will do so if the only deviation from the ideal conditions is that the chance of different individuals falling into the same divisions are not equal, as long as these chances are all small; (2) if in addition to this the chances of some individuals are large, a positive binomial will fit the results better than the exponential; (3) if the different divisions have different chances of containing individuals, as is most often the case in many statistics, a negative binomial will fit the results better than the exponential except so far as (2) may interfere; (4) if the presence of one individual in a division increases the chance of other individuals falling into that division, a negative binomial will fit best; but if it decreases the chance, a positive binomial will fit best.—*John W. Gowen.*

492. ANONYMOUS. **Inheritance investigations in swine.** Kansas Sta. Rept. 1918:42-43. 1918.—Greater width of forehead in Berkshire is dominant over lesser forehead widths of Duroc Jerseys, Tamworths and the wild hog. Straight face of Tamworth is dominant over dish face of Berkshire. Tamworth long face is dominant over Jersey short face. Erect ear of Berkshire is dominant over drooping ear of Duroc Jersey.—*H. L. Ibsen.*

493. ANONYMOUS. **Improvement and conservation of farm poultry.** Kansas Sta. Rept. 1918:43-45. 1 fig. 1918.—Standard bred males from high-producing strains of Barred Plymouth Rocks, single-comb White Leghorns, and White Orpingtons have been used in grading up mongrel flocks. The third-generation grade females in the case of the Plymouth Rocks and White Leghorns show marked increase in average first-year's production of eggs as compared with their mongrel great granddams. White Orpingtons show slight decrease. Check pen of mongrels showed slight increase.—*H. L. Ibsen.*

494. ANONYMOUS. **Inheritance of color in Andalusian fowl.** Kansas Sta. Rept. 1918:45. 1918.—Four factors seem to be responsible for feather color of Blue Andalusians: "(1) black pigment; (2) a restrictor of black pigment which makes it appear bluish gray; (3) an extender which carries pigment to all feathers of the body, and (4) lacing, which is responsible for the black edging of many of the contour feathers of both males and females."—*H. L. Ibsen.*

495. ANONYMOUS. **Discoveries in China, useful in California.** California Citrograph 3:49-50. 1 fig. Jan., 1918.—On new fruits; includes paragraph on plant breeding (selection) by Chinese farmers.—*Howard B. Frost.*

496. ANONYMOUS. [EDITORIAL.] **Tree records important.** California Citrograph 3:69. Feb., 1918. Records of yields urged, in relation to bud variation.—*Howard B. Frost.*

497. ANONYMOUS. [EDITORIAL.] **Bud selection wins again.** California Citrograph 3:121. Apr., 1918.—Prize-winning pomelos credited to bud selection.—*Howard B. Frost.*

498. ANONYMOUS. **The elimination of poor citrus strains.** California Citrograph 3:224. July, 1918.—Brief, popular.

499. ANONYMOUS. [EDITORIAL.] **Why trees did not bear.** California Citrograph 4:257. Aug., 1919.—History of a case of budding to an inferior strain of orange, quoted from A. D. SHAMEL.—*Howard B. Frost.*

500. ANONYMOUS. The protection of raisers of new plants. *Gard. Chron.* 66: 226. Nov. 1, 1919.—Raisers of new plants do not reap the just reward of their labor. The finders of fortuitous novelties need not be considered. The selectors of improved strains have as much right to recompense as the originators of the strains they improve. Some novelties, such as new apples, could not be rightly judged for several years. There are many objections to the patenting of plant novelties, and some to the registration of names of strains as trademarks.—*John Belling*.

501. ANONYMOUS. *Genetica*. *Zeitschr. Pflanzenzücht.* 7: 75. June, 1919.—Editorial notice of the Dutch journal, "*Genetica*."—*Geo. H. Shull*.

502. ANONYMOUS. Ungarische Pflanzenzucht-Aktien-Gesellschaft. [Hungarian plant-breeding company.] *Zeitschr. Pflanzenzücht.* 7: 74-75. June, 1919.—Announces the establishment of a corporation for the purpose of breeding and disseminating superior varieties of all the important agricultural crop-plants suited to the special conditions of each section of Hungary. Main office of the corporation is in Budapest.—*Geo. H. Shull*.

503. ANONYMOUS. Dairy cattle breeding experiments. *Hoard's Dairyman* 57: 544, 545. 3 fig. 1919.—Outline of plan to study transmission of economic dairy characters such as milk yield, percentage and color of butter-fat, fertility, vigor, etc. Plan involves inbreeding, line-breeding, and out-crossing, using pure breeds as the foundation stock.—*J. A. Dettlesen*.

504. ANONYMOUS. Agricultural research in Australia. *Advis. Council Sc. and Ind. Commonwealth of Australia Bull.* 7. 1918.

505. ANONYMOUS. Philip Reginald Gregory. *Bot. Soc. and Exchange Club, British Isles. Rept.* 1918. 5: 356. July, 1919.—Brief biographical sketch.—*G. H. Shull*.

506. ANONYMOUS (A. H. C.) [Rev. of: BOWER, F. O., J. G. KERR, AND W. E. AGAR. *Lectures on sex and heredity delivered in Glasgow, 1917-18.* 16 mo. vi + 119 p. Macmillan Co.: London, 1919.] *Jour. Botany* 57: 287-288. 1919.

507. ANONYMOUS. [Rev. of: LILLIE, F. R. *The problem of fertilization.* 278 p. University Chicago Press: Chicago, 1919.] *Trans. Amer. Microsc. Soc.* 38: 246-258. July, 1919.

508. ANONYMOUS. [Rev. of: MACFARLANE, J. M. *The causes and course of evolution.* 875 p. Macmillan Co.: New York, 1918.] *Trans. Amer. Microsc. Soc.* 38: 259-261. July, 1919.

509. ANONYMOUS. [Rev. of: MOORE, CARL R. *On the physiological properties of the gonads as controllers of somatic and psychical characteristics. I. The rat.* *Jour. Exp. Zool.* 28: 137-160. 5 fig. May 20, 1919.] *Trans. Amer. Microsc. Soc.* 38: 237-238. July, 1919.—See *Bot. Absts.* 3, Entry 1498.

510. ANONYMOUS. [Rev. of: POPENOE, PAUL, AND ROSWELL H. JOHNSON. *Applied eugenics.* 14 X 20 cm., v + 459 p., 46 fig. Macmillan Co.: New York, Oct., 1918.] *Trans. Amer. Microsc. Soc.* 38: 258-259. July, 1919.—See *Bot. Absts.* 3, Entry 279.

511. ANONYMOUS. [E.] [Rev. of: STARK, P. *Die Blütenvariationen der Einbeere.* (Floral variations of *Paris quadrifolia*.) *Zeitschr. induct. Abstamm. Vererb.* 19: 241-303. 35 fig. Aug., 1918. (See *Bot. Absts.* 3, Entry 2201.)] *Bot. Jahrb.* 55: 60. 1919.

512. ANONYMOUS. [Rev. of: STOLL, NORMAN R., AND A. FRANKLIN SHULL. *Sex determination in the white fly.* *Genetics* 4: 251-260. May, 1919. (See *Bot. Absts.* 3, Entry 1516.)] *Trans. Amer. Microsc. Soc.* 38: 292. Oct., 1919.

513. ANONYMOUS. [Rev. of: SUMNER, F. B. Continuous and discontinuous variations and their inheritance in *Peromyscus*. I, II, III, Amer. Nat. 52: 177-208, 290-300, 439-454. 1918.] Trans. Amer. Microsc. Soc. 38: 238-239. July, 1919.—See Bot. Absts. 1, Entries 245, 943.
514. BACH, SIEGFRIED. Noch ein Bastardierungsversuch *Pisum* × *Faba*. [Another hybridization experiment *Pisum* × *Faba*.] Zeitschr. Pflanzenzücht. 7: 73-74. June, 1919.—See Bot. Absts. 4, Entry 2172.
515. BACH, SIEGFRIED. Zur näheren Kenntnis der Faktoren der Anthozyanbildung bei *Pisum*. [To a more exact knowledge of the factors for the formation of anthocyan in *Pisum*.] Zeitschr. Pflanzenzücht. 7: 64-66. June, 1919.—See Bot. Absts. 4, Entry 2173.
516. BALLARD, W. R. Notes on geranium breeding. Proc. Amer. Soc. Hortic. Sci. 15: 62-65. 1918.—A brief description is given of several varieties of geraniums; "the geranium" of the garden not being a true *Geranium* but of the genus *Pelargonium*, probably derived from *P. zonale* and *P. inquinans*. The Snow, or Lady Washington, apparently descended from *P. cucullatum* and *P. angulosum*. The scented-leaved type is probably *P. pellatum*. In a study of resistance to a leaf and stem spot disease many types were found resistant when leaves are protected from rain. Disease resistance and flower characters are difficult to combine by breeding. Many seedlings exhibit increased vigor for several years, but degenerate. A list of crosses of like and different flower types shows singleness to be dominant. The nectar tube adnate to the flower stem in the true genus *Geranium*, is not constant in the zonal group and does not appear in the double flowers of any cross. It is apparently correlated with singleness. Species crosses are difficult and where possible the plants are not very fertile.—M. J. Dorsey.
517. BANTA, A. M. The results of selection with a *Cladocera* pure line. Proc. Soc. Biol. and Med. 16: 123-124. 1919.—Attempts to obtain by selection diversities with respect to reactivity to light within parthenogenetic pure lines (clones) of three species of *Cladocera* were positive in one line of *Simocephalus vetulus*. Averages for two-month periods were made for 54 months during which 181 generations were obtained. Considerable fluctuation in reactivity was noted but in course of time the mean for the plus strain decreased to one-half and finally to one-third that of the minus strain. Diversities in reactivity were not due to differences in vigor.—R. W. Hegner.
518. BAUMANN, E. Zur Frage der Individual- und der Immunitätszüchtung bei der Kartoffel. [On the question of individual selection in potatoes and the breeding for immunity.] Fühl. Landw. Zeitg. 67: 246-253. 1918.—See Bot. Absts. 4, Entry 1239.
519. BEAUVERIE, J. The present state of the study of anthocyanin. Rev. Gén. Sci. 29: 572-579. 1 fig. 29: 604-612. 1918.—A review of the work on anthocyanin,—its distribution and its chemical, physiological, cytological and genetical status. The genetic treatment is very brief, dealing mostly with the work of KEEBLE AND ARMSTRONG and MISS WHELDALE.—E. W. Lindstrom.
520. BENDERS. [Dutch rev. of: DE WILDE, P. A. Verwantschap en Erfelijkheid bij doofstomheid en retinitis pigmentosa. (Relationship and heredity in deaf-and-dumbness and retinitis pigmentosa.) Diss. Amsterdam. 1919.] Genetica 2: 90-91. Jan., 1920.
521. BIELSCHOWSKY, MAX. Entwurf eines Systems der Heredodegenerationen des Zentralnervensystemseinschliesslich der zugehörigen Striatumerkrankungen. [Suggestion of a system of hereditary degenerations of the central nervous system inclusive of the associated diseases of the striatum.] Jour. Psychol. Neurol. 24: 48-50. 1918.—Author expresses opinion that the underlying cause of many diseases involving the corpus striatum is a defective germ-plasm, and that even in certain cases where similar ancestral manifestations are not demon-

strable suspicion of hereditary degeneration is justified. A clinical classification is proposed for the better known hereditary forms of cerebral degeneration, but at the same time it is pointed out that the student of these conditions does not deal with sharply defined entities, since it is quite unusual, except among relatives, to find two cases that agree in all respects.—*C. H. Danforth.*

522. BLAKESLEE, A. F. *Plant genetics*. [Rev. of: COULTER, JOHN M., AND MERLE C. COULTER. *Plant genetics*. 13 × 19 cm., ix + 214 p., 40 fig. Univ. Chicago Press: Chicago, July, 1918.] *Plant World* 22: 181-182. June, 1919.—See Bot. Absts. 2, Entry 395.

523. BLARINGHEM, L. *Les problèmes de l'hérédité expérimentale*. [The problems of experimental heredity.] 12 × 19 cm., 317 pages, 20 fig. 1919.—Author presents various kinds of facts of heredity and offers classification of them; he intentionally omits characters recently acquired and not yet fixed, and also mutational phenomena; he takes special account of work of French hybridizers of the 19th century whom he thinks modern geneticists have neglected. The work is divided into three sections, dealing respectively with "normal heredity," species hybridization, and varietal crossings.—Section 1. After general discussion of the meaning of *purity* among living things author defines "pure line" giving it not only a genealogical concept but also one in which no divergent individuals may be included. Advantages of barleys for pure-line studies are emphasized. Hereditary phenomena to be observed when individuals of the same pure line are parents is named *normal heredity* and proofs of transmission of qualities of ascendants to descendants is here so evident that their investigation offers little attraction. If qualities of parents deviate from the mean of the line, progeny are expected to show regression and there arises what the author names "fluctuating heredity;" this occurs with continuous characters and is studied by biometrical methods. A sympathetic presentation of laws and formulae of regression, ancestral inheritance and of father-son correlation is given. Author regrets application of biometrical methods to discontinuous characters, as eye color, and points out that Mendelian heredity has given better account; he also deems it premature to apply them to psychological traits.—Section 2. Author asserts his belief in genetically permanent blends following on some hybridizations and takes exception to the idea of multiple factors with segregation. Examples of blending (*hérédité mixte*) often occur in crossings of species, even elementary species, where more or less sterility occurs in first generation. Mendel's laws are thought not to hold in these cases. Author conceives of combination in chemical sense, of certain cell elements, followed by expurgation or refining which leads to stabilization and increased fertility. He believes this process explains in part the diversity of species and genera. He gives the origin of *Aegilops speltaeformis* as a case of such permanent blend resulting from crossing of wheat and *Aegilops ovata*. Other cases cited are skin color in human beings, rabbit-hare hybrids, and *Cavia* species crosses.—This section treats also of "mosaic heredity," whose characteristics were set forth by Naudin about 1859 (hence also designated Naudinian heredity) on the basis of results of crossing *Datura stramonium* and *D. laevis*, former with spiny and latter with smooth capsules. Three of the 40 F₁ hybrids bore "composite" capsules [chimaeras], partly spiny and partly smooth, the extent of smoothness being greatest in the youngest capsules. These were interpreted by Naudin as the disengaging of two species forcibly united. Author's own work on barleys is cited in support of the existence of mosaic heredity; 14 of 17 hybrids of a certain cross uniformly exhibited spiny-nerved glumes, the remaining 3 exhibited mosaic behavior with individual heads bearing spiny, spineless and intermediate condition, with spineless glumes typically more frequent at base and tip of heads. The progeny of such smooth-glumed grains may not show smoothness again and spiny grains did not always give offspring uniformly spiny; this leads author to suppose independence between traits separated out (*dissociés*) on glumes and character of embryos enclosed by the glumes. The appearance of such mosaics is considered an indication of profound difference between lines united by hybridization. This somatic separation of characters occurs without precise rules but tends to show at extremities of the axes or in late buds. Section 2 discusses lastly "unilateral heredity." Species of *Fragaria* are cited as more or less subject to unilateral transmission. Author

upholds as reliable Millardet's publication (1894) on strawberry hybridizations. In one cross resulting in 15 F_1 plants 14 resembled the pistillate parent and 1 in its entirety the pollen parent. 53 F_2 descendants of the last maintained completely paternal appearance except for slight decrease in fruit size. Millardet found maternal characters more often transmitted in their entirety in these peculiar genetic phenomena named by the author unilateral heredity. 14 of Millardet's hybridizations gave 76 F_1 progeny of completely maternal type and in 224 F_2 descendants of latter maternal appearance was maintained in all except one individual. Millardet came to believe that this "false hybridization" was the rule in European *Fragarias*. Some *Fragaria* crosses, e. g., *F. virginiana*, *F. chiloensis*, are said to yield "true hybrids" rather than "false hybrids." Certain other *Fragaria* species crosses failed and were interpreted as showing specific divergencies of the first degree. Researches by Solms-Laubach on strawberries, by Lidforss on *Rubus* species, and other investigations confirmatory of unilateral transmission, are described. Following Giard author infers that unilateral heredity is due to development of one or the other of gametes brought together in hybridization.—Section 3 considers the crossing of varieties, where alternate or Mendelian heredity occurs. Mendel's experiments and algebraic rules inferred from them are presented in much detail. The reasoning of the "Czech monk" as applied to results in *Pisum* are considered justified by concordance of observed and calculated figures. Number of characters following Mendel's laws is believed to be limited and author prophesies that the field of "hérédité mixte" will offer most in future. Crossings of barleys involving spiny and spineless glumes showed that when the parents are closely related the F_2 numbers agree with simple expectations based on Mendel's laws but that in hybridizations between divergent lines, the genetic behavior is different. Mention is also made of a line of Svalöf barley characterized by spinelessness (recessive trait) and which bred true on testing in moist fertile soils, but which gave a large percentage of more or less spiny grains in dry soils. Author believes this line to be a case of a "fixed hybrid" which was induced to segregate in dry soil. On Mendelian theory the spineless line should have contained no latent spiny condition. Classification of varieties is offered: (1) Varieties due to color differences; (2) Those due to degrees of hairiness or smoothness; (3) Those based on differences in consistency; (4) Stature differences; (5) "grave anomalies" as pelorias, fusions of organs, etc. Brief discussion under each heading of results of hybridization and cases thought to be non-Mendelian are presented. Author urges careful observing of fertility of hybrids to ascertain degree of specific distinctness in lines crossed.—Finally, various hereditary processes are compared to phenomena in realms of physics and chemistry,—continuity, equilibrium and center of gravity, dissociation, combination, substitution, juxtaposition. Author's attention is especially attracted by opposition of continuity and discontinuity in biology, corresponding to physical variations and chemical combinations.—James P. Kelly.

524. BLISS, A. J. The protection of raisers of new plants. Gard. Chron. 66: 278. Nov. 29, 1919.—The patenting of horticultural novelties is advocated. The breeder of a selected strain might obtain a patent for the improvement, and pay a royalty to the original raiser. Mere registration of names would multiply varieties excessively. [See also next following Entry, 525.]—John Belling.

525. BLISS, A. J. The protection of raisers of new plants. Gard. Chron. 66: 316. Dec. 20, 1919.—Suggests that, in the trade lists of members of the Chamber of Horticulture, the name of the raiser should be placed after the name of every new variety. The registration and testing of new varieties, and the weeding out of obsolete ones, might well be undertaken by the Royal Horticultural Society. Thinks raisers of patented novelties might be required to give pedigrees, not necessarily for immediate publication. [See also next preceding Entry, 524.]—John Belling.

526. BOWER, F. O. Botany of the living plant. 15 × 22 cm., vii + 580 p., 447 fig. Macmillan & Co.: London, England. 1919.—Chapter 31, pp. 461-477, gives very elementary discussion of these topics, describing and illustrating mitotic division, particularly the reduction division and the resultant independent groupings of the chromosomes. The brief state-

ment of Mendelian heredity is taken from Punnett's Mendelism. "Mendelian segregation is not in itself a constructive process. It is a distributive agency. . . . The central question of evolution comes finally to be the origin of the heritable mutations. Of this as little is positively known at the moment as the constitution of the protoplasm that gives rise to them."—*Geo. H. Shull*.

527. BOWER, F. O., J. G. KERR, AND W. E. AGAR. Lectures on sex and heredity delivered in Glasgow, 1917-18. 16 mo., vi + 119 p., 49 fig. Macmillan Co.: London. 1919.

528. BRIERLY, W. B. Some concepts in mycology—an attempt at synthesis. Trans. British Mycol. Soc. 6: 204-235. 1919.—See Bot. Absts. 4, Entry 1061.

529. CALKINS, GARY N. *Uroleptus mobilis* Engelm. II. Renewal of vitality through conjugation. Jour. Exp. Zool. 29: 121-156. 1 fig., 1 diagram. Oct. 5, 1919.—In his second contribution on *Uroleptus mobilis* author finds that the protoplasm of a single specimen and its progeny exhibit a progressive decrease of vitality (as measured by fission rate) and final death if conjugation and endomixis (parthenogenesis) is prevented. In his experiments, conjugation was prevented by the maintenance of isolation cultures. Endomixis was known not to take place because no specimens encysted in these isolation cultures, and in this species, endomixis takes place only at a time of encystment. The results of the paper indicates clearly that a restoration of full metabolic activity follows the conjugation of two closely related individuals of one of these "degenerated" lines. In regard to the effect of encystment and its accompanying asexual reorganization, author believes that, "so far as the evidence thus far obtained is concerned, it appears that the initial vitality after encystment and parthenogenesis is as great as, or even greater than, that after conjugation." It is not known, however, whether this high potential is as enduring as that obtained from conjugation.—*W. H. Taliaferro*.

530. CARLE, E. Premiers travaux sur la sélection des riz du laboratoire d'étude des céréales à Saigon. [First work in selection of rice at the Saigon laboratory for the study of cereals. Bull. Agric. Inst. Sci. Saigon 1: 74-87. 1919.

531. CARRIER, L. A reason for the contradictory results in corn experiments. Jour. Amer. Soc. Agron. 11: 106-113. 1919.—Author's purpose is to show that the common methods of variety testing and related field experimentation with maize are unreliable on account of xenia effect upon size and weight of kernel through cross-pollination. The author's own experiments in planting separately seed of several different strains of certain varieties as compared with mixed lots of seed of these same strains indicate a marked increase in yield from the mixed planting, the result being attributed to this xenia effect. This is supported by experimental evidence of certain other investigators. The author recommends for practice that farmers select their seed corn after the well established types of their respective locality introducing occasionally seed of same variety, but from an unrelated strain brought in from an outside source.—*L. H. Smith*.

532. CASTLE, W. E. Does evolution occur exclusively by loss of genetic factors. Amer. Nat. 53: 555-558. Nov.-Dec., 1919.—A recent statement of belief by DUERDEN (Amer. Nat. 53: 312) that selection can be effective only in the direction of degeneration of a character, made in connection with wing and toe characters of the ostrich, is criticized by the author. Among other considerations, the latter cites his successful use of selection both in increasing and in decreasing the amount of white in hooded rats and in recovering an ancestral fourth toe on the hind feet of guinea-pigs.—*Sewall Wright*.

533. CASTLE, W. E. The rôle of selection in evolution. An agency for the elimination of variations. Sci. Amer. Supplem. 87: 66-67, 90-91. 1919.—Selection as a factor in evolution is discussed and its relation to various theories analyzed. No real diversity of views regarding selection exists, but only concerning nature of material upon which it works. Author

holds that selection is effective in pure lines, at least in some cases.—Genes vary in stability, some yielding to selection much more readily than others. From results of experimental breeding, author comes to the belief that selection can cause further variability. Opinion is expressed that selection is the most reasonable explanation of evolution. However, it cannot institute new lines of variation but acts in modification of existing types and in direction in which variations tend.—*E. Roberts.*

534. CASTLE, W. E. Inheritance of quantity and quality of milk production in dairy cattle. *Proc. Nation. Acad. Sci. (U. S.)* 5: 428-434. Oct., 1919.—The material presented is that collected in Bowlker's herd of F_1 and F_2 cows from crosses of pure-bred Holstein-Friesian and Guernsey animals reciprocally mated.—Mass methods are used throughout the paper. Of 31 F_1 cows at ages ranging from $2\frac{1}{2}$ to $3\frac{1}{2}$ years with milk yield over 7- to 12-months periods, the average milk production was 6612 pounds of milk, 4.08 per cent butter fat and 270 pounds butter fat in the first lactation. The second lactation average was 8663 pounds of milk and 363 pounds of butter fat.—The data for pure-bred Holstein-Friesian herd (25 cows) ranged in age from $2\frac{1}{2}$ to $3\frac{1}{2}$ years and in the length of lactation from $8\frac{1}{2}$ to 12 months. In the first lactation the averages were 7673 pounds of milk and 3.4 per cent butter fat (on 8 cows) and 261 pounds of butter fat (on 8 cows). The second lactation, age range $3\frac{1}{2}$ to $4\frac{1}{2}$ years, length of lactation $7\frac{1}{2}$ to 12 months, average for milk 9475 pounds and butter fat 322 pounds. The Guernsey herd (8 cows) ranged in age from $2\frac{1}{2}$ to 3 years, length of lactation $7\frac{1}{2}$ to 12 months, and average in milk 4617 for first lactation and for the second 5593 pounds.—No correction for increased milk yield with age is made other than that of averaging the parental and F_1 herd's milk production.

Comparison of these average milk yields shows that of the F_1 herd to be 1061 pounds of milk less than the average yield of the pure Holsteins, but 1995 pounds more than the average yield of the pure Guernseys. The average butter-fat percentage content indicates an average butter-fat content of 4.08 per cent, which is slightly less than intermediate between the 3.4, the butter-fat percentage of the pure Holsteins and 5.0, the butter-fat percentage of the pure Guernsey. In those F_1 cows which have a second lactation the approach to the higher milk yield of the pure Holstein-Friesian is even more striking.—In butter-fat production (milk yield \times butter-fat percentage) the Holsteins averaged 322 pounds, the Guernseys 280 pounds, the F_1 363 pounds.—These results seem to be considered as due to an increased vigor of the F_1 hybrids due to the out-cross.—Comparisons were made of the milk yield and butter fat of F_1 cows coming from the cross Holstein cow \times Guernsey bull and its reciprocal. The milk yield and butter fat were found to be approximately equal in the two crosses, variations occurring in both directions. From this the conclusion is made, that it seems unlikely that any sex-linked factors are concerned in the case.—*John W. Gowen.*

535. CASTLE, W. E. Are genes linear or non-linear in arrangement? *Proc. Nation. Acad. Sci. [U. S.]* 5: 500-506. Nov., 1919.—Rebuttal to criticisms made by Morgan and his associates to conclusions of a former paper by Castle on same subject. Position taken by Castle and here reaffirmed is (1) that forces linking genes together are possibly molecular rather than mechanical; (2) reconstruction of sex-chromosome data of Morgan and Bridges proves arrangement cannot be linear; (3) values of crossovers greater than 50 per cent necessitated by linear hypothesis have never been observed and are logically impossible; (4) non-linear hypothesis is simpler because it eliminates secondary hypothesis needed on linear hypothesis to harmonize greater with lesser crossover values, particularly the hypothesis of double crossing over. Little new data are presented in this discussion, attention being devoted chiefly to extensions and further exposition of material presented previously in support of above propositions.—*John W. Gowen.*

536. CHACE, E. M., AND C. G. CHURCH. Notes on California and Arizona grapefruit. *California Citrograph* 3: 200-201. 5 tables, 2 diagrams. July, 1918.—On maturing and composition of fruit; includes analyses of nine "off types" of Marsh pomelo, in comparison with "standard types," showing inferiority of certain bud-variation strains.—*Howard B. Frost.*

537. CHAMBERLAIN, C. J. Chondriosomes in plants. [Rev. of: MOTTIER, D. M. Chondriosomes and the primordia of chloroplasts and leucoplasts. *Ann. Botany* 32: 191-214. 1 pl. 1918.] *Bot. Gaz.* 67: 270-271. Mar., 1919.—See *Bot. Absts.* 4, Entry 169.

538. CHAMBERLAIN, C. J. Cytology of gigantism. [Rev. of: TISCHLER, G. Untersuchungen über den Riesenwuchs von *Phragmites communis* var. *pseudo-donax*. (Investigations of the gigantic growth of *Phragmites communis* var. *pseudodonax*.) *Ber. Deutsch. Bot. Ges.* 36: 549-558. 1918.] *Bot. Gaz.* 69: 192. Feb., 1920.—See also *Bot. Absts.* 3, Entry 1040.

539. CHITTENDEN, FRED J. Seedling potatoes. *Gard. Chron.* 66: 264. Nov. 22, 1919.—Gives examples of seedling potatoes which, as far as could be determined by visible characters, were identical to varieties previously introduced. Raises question whether such phenotypically similar plants may not differ in other characters such as greater cropping power.—*Fred A. Krantz.*

540. CHOPARD, L. Note sur un individu hermaphrodite de *Clonopsis Gallica* Charp. (Orth. Phasmidae). [Note on a hermaphrodite specimen of *Clonopsis gallica*.] *Bull. Soc. Zool. France*, 43: 168-175, 4 fig. 1919.—Author describes a specimen of phasmid, *Clonopsis gallica*, Charp. which exhibited both male and female characteristics, in part blended together, and in part separated asymmetrically. He discusses proposed explanations for the occasional occurrences of males and hermaphrodites in species which normally produce only parthenogenetic females. He inclines toward the view that unfavorable conditions are the cause.—*Sewall Wright.*

541. CLAIR, H. W. Scottish chamomiles. *Chem. and Druggist* 91: 1512. 1919.

542. CLEMENTS, E. Variation and mutation in *Epilobium*. *Carnegie Inst. Washington Year Book* 17: 293. 1918.—No results yet presented, but statement that "the production of flower mutation by manipulating the flow of food to different parts through pruning, mutilation, change of position, correlation, etc., has proved unusually successful."—*Merle C. Coulter.*

543. CLOUSTON, D. The selection of rice on the Raipur Experimental Farm. *Agric. and Co-op. Gaz. [India]* 157: 5-9. 1919.—The author describes the method of improvement of available varieties of rice (*Oryza sativa*) by mass selection, and the testing of promising varieties in plots. Rice cultivated in the Central Provinces, India, falls into three classes: early, maturing in 3 to 4 months and suitable for upland soils; medium, maturing in 4 to 5 months; and late, maturing in 5 to 6 months, suitable for irrigated land only. Late varieties give the largest yield.—*Winfield Dudgeon.*

544. COATES, LEONARD. Improvement of fruit trees. *California Citrograph* 3: 52. 1 fig. Jan., 1918.—Tree-fruit breeding; popular; describes a bud mutant in the French prune.—*Howard B. Frost.*

545. COCKERELL, T. D. A. Some western columbines. *Torreyia* 19: 137-141. July, 1919.—A discussion of observations upon *Aquilegia desertorum*, *A. elegantula*, *A. chrysantha*, and their crosses which indicate that *Aquilegia* is an unusually favorable genus for the investigation of genetic problems. Some of its advantages are the following: (1) The ready hybridization and the fertility of the F₁. (2) Tendency to mutate, apart from crossing. (3) The existence of spurred and spurless forms, and of forms with and without colored plastids and anthocyanin colors. (4) The heterozygotes can be easily preserved and propagated by dividing the crowns. (5) Incidentally, beautiful and interesting garden plants are produced.—*F. O. Grover.*

546. COLE, LEON J. A defect of hair and teeth in cattle—probably hereditary. *Jour. Heredity* 10: 303-306. Fig. 6-10. Oct., 1919.—A note on the occurrence of defective teeth and hair in a herd of pure-bred Holstein-Friesian cattle. A pure-bred sire having defective

teeth and bred to pure-bred cows, produced in 2 successive years 5 calves with deficient coats, 3 of which are known to have defective dentation corresponding to the sire. Since the bull was not born on the place and all of the calves including 15 to 20 normal ones were all reared under similar conditions it is probable that the cause is genetic rather than physiological.—*Maxwell J. Dorsey.*

547. CONKLIN, EDWIN GRANT. *Heredity and environment in the development of men.* 3rd ed., 15 × 21 cm., v + 361 p., 101 fig. Princeton University Press: Princeton, N. J. 1919. —Present edition like previous ones is divided into six chapters. (1) Facts and factors of development. Includes detailed treatment of development of body and mind and discussion of theories of development. Emphasis is placed on essential unity of organisms; intrinsic (hereditary) and extrinsic (environmental) factors of development are discussed. (2) Phenomena of inheritance. Observations on inheritance are described and statistical and experimental methods of study are compared. List of human characters which Mendelize is given. Doctrine of universality of Mendelian principles is supported. (3) Cellular basis of heredity. Includes account of germ-cell formation and behavior in fertilization, sex-determination, mechanism of heredity and of development. Specific rôles of chromatin and cytoplasm in heredity and development are contrasted. (4) Influence of environment. Includes discussion of relative importance of heredity and environment and account of experimental modification of development. (5) Control of heredity; eugenics. Methods of breeding employed in establishment of domesticated races of animals and plants are described and control of human heredity is discussed. (6) Genetics and ethics. Voluntaristic conception of nature and of human responsibility, mechanistic conception of nature and of personality, determinism and responsibility, the individual and the race, are topics discussed. Potentialities of development are contrasted with actualities; heredity is regarded as determining a limit, closeness of approach to which depends upon factors of development. List of larger references, glossary, and index complete the book. Subject material and illustrations are carefully selected; animal side is emphasized, but plant side is not neglected; each phase of the subject is developed logically; historical allusions are skillfully interwoven in the text; and biological principles are related in a scholarly manner to the great body of human thought.—Present edition differs from second only in minor changes in text and figures, except in third chapter which has been rearranged and revised in order to give proper weight to results of *Drosophila* investigations. Among other changes are introduction of more numerous chapter headings, exchange of places of second and third chapters, and reduction in number of pages (from 550 in second edition), which has been accomplished by use of smaller type. Subject material has been very slightly augmented, number of figures has been increased from 96 to 101.—*R. E. Clausen.*

548. CONKLIN, E. G. *The mechanism of evolution in the light of heredity and development.* Sci. Monthly 9: 481-505. 1919. *Ibid.* 10: 52-62. Fig. 1-10. 1920.—The illustrations are all zoological.—The paper discusses the experimental and analytical studies of inheritance and development in their relation to evolution.—*L. Pace.*

549. COOK, O. F. *Olneya beans.* Jour. Heredity 10: 321-331. Fig. 13-17. 1919.—A discussion of the economic and genetic possibilities of *Olynea tesota*, a southwestern desert leguminous tree. The wood is heavy and hard, the beans edible and the tree hardy. There are many possibilities in selection both for bean production and as a wood plant for the desert.—*Maxwell J. Dorsey.*

550. CORRENS, C. *Vererbungsversuche mit buntblättrigen Sippen. II. Vier neue Typen bunter Periklinalchimären.* [Genetical studies with variegated races. II. Four new types of variegated periclinal chimeras.] Sitzungsber. K. Akad. Wiss. 44: 820-857. 1919.—The four new types of periclinal chimeras described are, *leucodermis* (found in *Arabis, Aubretia*); *pseudoleucodermis* (found in *Arabis, Glechoma*); *chlorotidermis* (found in *Arabis*); and *alboepelliculatus* (found in *Mesembryanthemum*). They are compared with Baur's '*albotunicatus*' type found in *Pelargonium*.—All four types are anatomically alike. *Leucodermis*, *pseudoleucodermis* and *albo-*

pelliculatus have a white cell layer below the epidermis and a green core, thus showing green and white in the leaves. *Chlorotidermis* has a bright yellow-green subepidermal layer and a green core.—*Leucodermis* and *albopelliculatus* are classed together since both transmit the white "diseased" condition of the subepidermal layer to their seedling progeny. This transmission is produced only through the egg cells, not through the pollen. The genotype of the nucleus is the same in both the white subepidermal layer and the green core.—*Pseudoleucodermis* and *chlorotidermis* are similar. In this case, the seedling progeny inherits the white or pale green character of the subepidermis through a definite Mendelian factor that is recessive to normal green. There is no transmission or cytoplasmic inheritance here. The nucleus of the white or pale green subepidermis contains this recessive factor, while the green cells of the same plant contain the dominant allelomorph in a homozygous or heterozygous condition.—E. W. Lindstrom.

551. CORRENS, C. Vererbungsversuche mit buntblättrigen Sippen. I. *Capsella bursa-pastoris albobariabilis* und *chlorina*. [Genetical studies with variegated races. I. *Capsella bursa-pastoris albobariabilis* and *chlorina*.] Sitzungsber. K. Akad. Wiss. Wien 34: 585-610. 1919.—The *chlorina* race of *Capsella* is a pale-green type which is inherited as a simple Mendelian recessive to normal green. A physiological examination of the chlorophyll content indicates that there are two kinds of *chlorina* plants, one *euchlorina* with 45 per cent and the other *subchlorina* with 65 per cent of the normal chlorophyll content.—The *albobariabilis* race is a white-variegated type that shows a great deal of variation in the proportion of green and white areas in the leaves and seed capsules. The author says that the *albobariabilis* character may be thought of as a disease, the inheritance of which is governed by a Mendelian pair of factors. *Albobariabilis* is recessive to normal green. In the F_2 generation both 3:1 and 15:1 ratios were obtained, indicating that there are two pairs of factors concerned.—Selection for increase of green or of white variegated progeny from *albobariabilis* was effective. This, the author is inclined to attribute to the action of modifying genes. The selection process had two general effects, one a temporary and the other a permanent one.

The temporary result which last only as long as selection continued, was obtained when the selection was in the direction towards increased amount of variegation. The permanent result was achieved when the selection was made towards full green.—E. W. Lindstrom.

552. COSTANTIN, J. La mutation. État actuel de la question. [Mutation. Present status of the question.] Ann. Sci. Nat. Bot. X. 1: iii-xxix. 1919.—Of various mutants reported by DE VRIES author dwells particularly on *Oe. gigas*; at first anomalous in that it originated only once in early culture. More recently GATES studied a *gigas* that originated at Palermo and HERIBERT-NILSSON obtained a *gigas* mutant at Lund. Gates linked up *gigas* traits with doubling of chromosome number which led to enlargement of individual cells. Author cites work of the Marchals who by cuttings from sporophytes of mosses secured $2x$ gametophytes different from $1x$ gametophytes; considered mutation experimentally produced; refers to relation of cell characters to chromosome number in the Marchals' moss mutations, *Oenotheras*, and in banana varieties. After emphasizing cases connected with alteration of chromosome numbers author refers briefly to BABCOCK's discussion (1918) on factor mutation in plants with same visible chromosome complex. Author considers possibility of the *Oenothera* mutation phenomena being results of a previous hybridization as suggested by Bateson and Saunders in 1902, opposed by MacDougal (1903), reaffirmed by Davis (1911), who synthesized a *Lamarckiana*-like form, and by Lotsy (1916), who considered *O. Lamarckiana* a heterozygote on basis of crossing results. Leclerc de Sablon explains *Oenothera* mutation phenomena on basis of heterozygous factors that are linked and thus show reduplication at gametogenesis. The *nanella* mutant is discussed and Zeylstra's discovery of bacterial parasite often associated with nanism. Two mutations in *Capsella* are considered by author large enough to be generic changes, i.e., *C. Heegeri*, whose capsule resembles that in genus *Camelina* and *C. Viguieri* with capsule like that of genus *Holargidium*. Theoretic edifice of De Vries (pangenes in active, inactive, and labile conditions) is given to explain mutation and remarkable hybridization results in *Oenotheras*. Origin of labile (unstable) pangenes from others gives

pre-mutation period which prepares way for period of repeated mutation; latter ceases when labile pangenomes become stable. Author believes De Vries has neglected action of physico-chemical forces as causes of mutation; Blaringhem's work on traumatism in maize is cited as confirmatory here. Considering all things mutation theory is deemed not discredited.—*J. P. Kelly.*

553. COULTER, J. M. Aaron Aaronsohn. *Bot. Gaz.* 68:388-389. 1 *portrait*. Nov., 1919.—Subject of this brief sketch lost his life May 15, 1919 in an airplane accident in France. He is well known for his discovery of wild wheat in Palestine, whose value as a foundation for the production of varieties suited to arid regions, he immediately recognized. He organized the Jewish Agricultural Experiment Station at Haifa, Palestine, where breeding of cereals and fruits was undertaken. "In Aaronsohn's death, at the age of 42, the science of plant-breeding, especially in its practical application in semi-arid regions has probably lost its most promising investigator."—*Geo. H. Shull.*

554. COULTER, MERLE C. Quantitative nature of sex. [Rev. of: SCHAFFNER, JOHN H. The nature of the dioecious condition in *Morus alba* and *Salix amygdaloides*. *Ohio Jour. Sci.* 19:409-416. 1919. (See *Bot. Absts.* 3, Entry 1575.)] *Bot. Gaz.* 68:485. Dec., 1919.

555. CROW, J. W. Vegetable seed growing and breeding. *Proc. Amer. Soc. Hortic. Sci.* 15:88-93. 1918.—From work being carried on at the Agricultural college at Guelph, Ontario, it is found that good seed of most vegetable crops can be grown in Canada. As most varieties of vegetables are far from pure author recommends that growers select their own seed with aim of securing greater uniformity. He gives suggestions on methods of selection, and details of drying and curing seed.—*John Bushnell.*

556. CUTLER, G. H. A dwarf wheat. *Jour. Amer. Soc. Agron.* 11:76-78. 1919.—In commercial plot of Marquis wheat a dwarf plant occurred. Some typical Marquis heads were selected and sown in head rows. One row produced tall and dwarfs. Origin of dwarf was not clear. Author concludes dwarfness is simple dominant to tallness. [See also *Bot. Absts.* 3, Entry 171.]—*H. H. Love.*

557. DAHLGREN, K. V. O. Über einige Kreuzungsversuche mit *Chelidonium majus* L., *Polemonium coeruleum* L., und *Lactuca muralis* L. [On several crossing experiments with *Chelidonium majus* L., *Polemonium coeruleum* L., and *Lactuca muralis* L.] *Svensk. Bot. Tidskr.* 12:103-110. 1918.—*Chelidonium majus* with normal leaf and single flower crossed with *C. laciniatum* with laciniate leaf and double flower, results in dominance of normal leaf and single flower and a 9:3:3:1 segregation in F_2 . In *Polemonium coeruleum* L. blue flower color is dominant to white. In *Lactuca muralis* L. the normal green leaf was found to be dominant to red leaf with a 3:1 segregation in F_2 .—*Karl Sax.*

558. DAVENPORT, C. B. Exhibit showing the results of selection for a new buff race. *Proc. Soc. Exp. Biol. and Med.* 16:124-125. 1919.—An attempt was made to create a uniform buff race from the jungle fowl by crossing and selection, but at the end of 10 years no progress was evident. The author concludes that the original buff race of domestic poultry probably originated as a xanthic sport.—*H. D. Goodale.*

559. DAVENPORT, CHARLES B. [Rev. of: POPENOE, PAUL, AND ROSWELL H. JOHNSON. *Applied eugenics*. 14 × 20 cm., v + 459 p., 46 fig. Macmillan Co.: New York, Oct., 1918. See *Bot. Absts.* 3, Entry 279.] *Mental Hygiene* 4:248-249. Jan., 1920.

560. DE BEAUVERIC, J. Los metodos des eleccion aplicados a los cereales. [The methods of selection applied to the cereals.] *Jalisco Rural [Mexico]* 1:213-215, 233-235, 256-258. 1919.—Popular.

561. DETJEN, L. R. Some F_1 hybrids of *Vitis rotundifolia* with related species and genera. North Carolina Agric. Exp. Sta. Tech. Bull. 18: 1-50. 33 fig. Aug., 1919.—Hybrid vines derived from *Vitis rotundifolia* and species of *Euvitis* are usually more or less intermediate in character.—The muscadine group when hybridized with species of *Euvitis* is not as prepotent in regard to its external visible characteristics as has generally been supposed.—Hybrids derived from *Vitis rotundifolia* and species of *Euvitis* are almost sterile, due mainly to hybridization. Perfect hermaphroditic forms are sterile from this cause alone, while imperfect hermaphroditic and staminate vines are sterile because of the double phenomenon of sex or intersexualism and hybridization.—So-called "false hybrids" referred to in horticultural literature as hybrids between Muscadine vines and species of *Euvitis* are not hybrids but straight seedlings of the supposedly dominant parent species *Vitis rotundifolia* and *Vitis Munsoniana*.—R. A. Jehle.

562. DETJEN, L. R. The limits in hybridization of *Vitis rotundifolia* with related species and genera. North Carolina Agric. Exp. Sta. Tech. Bull. 17: 1-25. July, 1919.—*Vitis rotundifolia* will hybridize with *V. Munsoniana* and the following species of *Euvitis*; *V. vinifera*, *V. Bourquiniana*, *V. labrusca*, *V. cordifolia*, and *V. aestivalis*, also with the varieties Winchell, Concord, and others.—*Vitis rotundifolia* would not hybridize with *Parthenocissus tricuspidata*, or *Ampelopsis heterophylla* var. *elegans*.—*Vitis rotundifolia* will hybridize with its own F_1 hybrids with other species of *Vitis*.—*Vitis rotundifolia* when used as a male parent will hybridize quite readily with some species of *Euvitis* but when used as a female parent it will hybridize only rarely.—R. A. Jehle.

563. DETLEFSEN, J. A., AND E. ROBERTS. Variation in the percentage of crossovers and selection in *Drosophila melanogaster*. Anat. Rec. 17: 336. Jan. 20, 1920. [Author's abstract of paper read before American Society of Zoologists, St. Louis, December 30, 1919.]—Series A. Long-winged red-eyed F_1 females heterozygous in miniature wing and white eye were mated in pairs to their miniature-winged white-eyed F_1 brothers. The F_2 offspring of the F_1 female showing the lowest percentage of crossing over were selected and mated. Continued inbreeding and selection gave a stock showing about 0 per cent crossovers at the end of ten generations, as compared with 33 per cent at the beginning of the experiment. This stock bred *en masse* for 6 more generations continued to give about 0 per cent crossovers. For example, in the F_{15} we obtained 2 crossovers in a total of 977.—Series B. The same experiment was begun a year later with stock entirely unrelated to that of series A. Inbreeding and selection were continued for 28 generations and gave a stock showing 5 per cent crossovers, as compared with the normal 33 per cent at the beginning of the experiment. The stock has bred true to about 5 per cent crossovers for 10 generations.—Decrease in percentage of crossover has been accompanied by the increased appearance of non-disjunctional females. Tentatively, we have concluded that selection has increased the amount of heterosynapsis which would thus prevent the appearance of crossover classes.—J. A. Detlefsen and E. Roberts.

564. DETLEFSEN, J. A., AND E. ROBERTS. Linkage of genetic factors in mice. Anat. Rec. 17: 338. Jan. 20, 1920. [Author's abstract of paper read before American Society of Zoologists, St. Louis, December 30, 1919.]—Data were obtained to throw light on 17 of the possible 21 linkage relationships which may exist between any 2 of the following 7 allelomorphous pairs: agouti vs. its absence, black vs. brown, dark eye vs. pink eye, self vs. recessive spotting, dominant spotting vs. its absence, normal gait vs. waltzing, and color vs. albinism. In all cases except those involving either black, or dark-eye, or self with normal gait, the hybrids were mated back to the ultimate recessive to obtain data in the most advantageous form for disclosing linkage. In the exceptional cases the F_1 generation was mated *inter se*. As a test against simple Mendelian recombination, sixteen of the seventeen cases showed no wide deviations, and thus rule out any linkage except of such a loose nature that enormous numbers would be required to show it, which, for practical purposes is tantamount to no linkage. In the case of dark eye and color, a definite linkage was found, both when the F_1 was mated *inter se* and when back-crosses were made to the ultimate recessive. The latter case is the

more reliable and shows 16.1 per cent crossovers in a total of 1449. The results from F_1 mated *inter se* giving a total of 768 agree tolerably well with this.—*J. A. Detlefsen and E. Roberts.*

565. DETLEFSEN, J. A., AND W. W. YAPP. On the inheritance of congenital cataract in dairy cattle. *Anat. Rec.* 17:339. Jan. 20, 1920. [Author's abstract of paper read before American Society of Zoologists, St. Louis, December 30, 1919.]—A pure-bred Holstein-Friesian bull, R. T. H., was mated to unrelated cows, and produced 93 normal F_1 offspring. His normal F_1 son, I. V. H., was mated to 32 normal F_1 sisters and half-sisters, giving 63 offspring, of which 8 (6 bulls + 2 heifers) showed well-defined congenital cataract. The sire, E. T. H., was also mated to 6 F_1 daughters, producing 7 offspring, of which 3 (1 bull + 2 heifers) were blind. If congenital cataract is a simple recessive character, then the sire and son should produce a population of which 12.5 per cent are blind. The total results, 70 offspring, of which 59 were normal and 11 were blind, agree tolerably well with the calculated expectation, 61.25 normal plus 8.75 blind.—*J. A. Detlefsen and W. W. Yapp.*

566. DORSEY, M. J. Bud variation as a practical asset in horticulture. *Minnesota Hortic.* 46:304-311. 2 fig. 1918.—Relation between bud variations and improvement of horticultural varieties. Cites monographs of New York (Geneva) Station which show that 5 of 2664 varieties (apple, cherry, grape and plum) arose by bud variations. Gives instance of supposed bud sport in Duchess apple, which reproduced itself when top-worked. Shape of apple was unchanged but fruit was of darker red color. Selection of scions from best plants is sound practice.—*H. K. Hayes.*

567. DORSEY, M. J. A study of sterility in the plum. *Genetics* 4:417-488. 5 pl. Sept., 1919.—Sterility is of the type of self- and cross-incompatibility and of embryo abortion. Normal pollen development typical; many aborted grains found in all varieties investigated and in some supposedly pure species but pollen abortion not a cause of sterility except in rare instances where suppression is complete. Percentage of aborted pollen higher in hybrids than in species supposed to be pure. Pistils drop in three separate and distinct waves: immediately after bloom, pistils aborted; 2 to 4 weeks after bloom, pistils not fertilized; 2 weeks later "June drop," pistils fertilized but embryo development stopped. Pollen abortion considered to be due to haploid factor combinations not suitable for development.—*D. F. Jones.*

568. DUERDEN, J. E. The germ plasm of the ostrich. *Amer. Nat.* 53:312-337. 3 fig. July-Aug., 1919.—Germ plasm (or determiners) of the ostrich is considered from two opposing view points, one holding it to be stable, the other labile. In support of the first view, it is stated that each bird produces over 200 feathers annually, which are minutely examined. In the 50 years of methodical ostrich farming " . . . a feather variation, germinal in its origin, such as could be regarded as of the nature of a sport or mutation" has not appeared. On the other hand, there is considerable variation in the number of remiges, wing coverts, toe nails and the scutes of the feet, thus affording evidence of instability of the germ plasm.—*H. D. Goodale.*

569. DUNN, L. C. Anomalous ratios in a family of yellow mice suggesting linkage between the genes for yellow and for black. *Amer. Nat.* 53:558-560. Nov.-Dec., 1918.—A family of yellow mice heterozygous for factors Y for yellow, and B for black, descended from a cross of black and tan, $YyBB$, and brown $yybb$, has given an excess of brown and a deficiency of black young among the non-yellow animals produced. It seems that linkage between factors for Y and B is involved or that discrepancies are due merely to chance. Further data to decide this point are hoped for.—*C. C. Little.*

570. DÜRKEN, BERNHARD. Einführung in die Experimentalzoologie. [Introduction to experimental zoology.] $x + 446$ p., 224 fig. Julius Springer: Berlin. 1919.

571. EAST, EDWIN M., AND DONALD F. JONES. *Inbreeding and outbreeding*. 14×21 cm., 285 p., 46 fig. J. B. Lippincott: Philadelphia. 1919.—Early marriage customs and methods of animal breeding are founded upon conclusion that inbreeding frequently gives undesirable results. Inbreeding, however, has been often practiced and has given us our best races of horses, swine, cattle and poultry, while in Ancient Egypt and Greece at height of their power rather close inbreeding was practiced. One purpose of authors is to present critical data as basis of determining application of certain fundamental principles to sociology, agriculture and evolutionary theory.—In concise, clear manner are presented well known facts of reproduction in plants and animals together with cytological basis upon which mechanism of heredity depends. These facts furnish principles upon which explanation of heterosis has been developed.—It is shown that, in general, sexual reproduction occurs in higher forms of life and asexual in simpler, although many of our most vigorous plants are usually self-fertilized. Degeneracy which often occurs in asexually propagated varieties of potato and sugar cane is most logically explained by diseases which are with difficulty eradicated because of the method of propagation. Conclusion reached that Knight-Darwin Law should read "Nature discovered a great advantage in occasional cross-fertilization." Adaptations for cross-pollination in plants are briefly discussed.—Well known facts of Mendelism, together with present factor hypotheses, relative stability of factors and analogies between this explanation and the stability of the chemical atom are clearly outlined. Although chemical element radium is breaking down rapidly this does not seriously detract from value of atomic theory. Likewise occasionally demonstrated changes which occur in factors do not seriously mar value of factor hypotheses, for they occur so infrequently that theory of permanent entity is justified.—Mathematical considerations of inbreeding are presented. Formulae for comparative measure of actual number of ancestors compared with possible number are given for different systems of mating. It is stated that these formulae do not tell anything concerning actual germinal constituents of any individual resulting from given system of inbreeding. Formulae for increase of homozygotes in any generation following cross when self-fertilization is practiced are presented. It is demonstrated that decrease in heterozygosity is automatic and varies with closeness of inbreeding. The way in which factor linkage modifies results is illustrated for two factor pairs. That artificial self-fertilization in cross-fertilized species and normal self-fertilization in self-fertilized species following artificial cross, give same results from Mendelian standpoint is clearly proven.—In light of these mathematical considerations results of controlled inbreeding experiments are analyzed. Results from animal and plant field are presented with special emphasis upon long-continued experiments of self-fertilization with maize as obtained at the Connecticut Experiment Station. All experiments show that "inbreeding has but one demonstrable effect on organism subjected to its action—the isolation of homozygous types." Inbreeding is not injurious "merely by reason of consanguinity." Facts of hybrid vigor or heterosis are next reviewed and cause of heterosis discussed. Review of theories of hybrid vigor given and present conception of combined action of dominant linked factors shown to be closely related to former physiological stimulus idea. Conclusion reached that "Homozygosity when obtained with the combination of all the most favorable characters is the most effective condition for the purpose of growth and reproduction."—Sterility is discussed and conclusion reached that sterility often accompanying inbreeding is not same thing as sterility resulting from hybridization. First case is phenomenon of Mendelian heredity because certain segregations have occurred which accomplish certain end results. In other case individuals are sterile because they cannot go through this same process because of lack of compatibility of uniting cells.—It is pointed out that the vital feature of cross-fertilization from standpoint of evolution "is to be explained solely on the ground of offering selective agencies the greatest amount of raw material."—As applied to plant and animal improvement, effects of inbreeding and outbreeding are discussed. Inbreeding is shown to be important agency in bringing about uniformity and concentrating desirable qualities in particular race while crossing induces variability as basis for origin of new and valuable types of plants and animals. As the F_1 is often more vigorous than its parents, it is logical to maintain pure races which are used as parents, the F_1 cross being grown as commercial product.—Application of the truths so ably developed, to science of eugenics is interestingly discussed. Racial mix-

tures induce variability while periods of inbreeding give opportunities of isolating desirable recombinations. Wide crosses should apparently be discouraged. Chances for racial stamina shown to be much greater when ingredients in the Melting Pot are sound at beginning.—*H. K. Hayes.*

572. EISEL, GEORG. Zur Kenntnis zweier Formen der Heredodegeneratio nervosa mit pseudo-bulbärparalytischen Symptomen. [To the knowledge of two forms of heredodegeneratio nervosa with pseudo-bulbal paralytic symptoms.] Inaug.-Dissertation. Rostock, 1918.

573. FEENSTRA-SLUITER, C. Waarnemingen en Beschouwingen over Bloei, Bevruchting en Zaadvorming bij *Cinchona Ledgeriana* Moens. [Observations and considerations concerning flower, fructification, and seed formation with *Cinchona Ledgeriana* Moens.] Mededell. Kina Proefsta. Dept. Landb. Nijverheid en Handel. [Tjinjiroean Java] 6: 1-35. 4 pl., fig. 1-20. 1919.—See Bot. Absts. 4, Entry 936.

574. FISHER, R. A. The genesis of twins. *Genetics* 4: 489-499. 2 fig. Sept., 1919.—THORNDIKE'S statistical study of twins shows absence of two distinct categories. Author believes that this demands a new theory of twinning in which heredity is from one gamete only. Suggests that uniovular twinning may be due to double fertilization and accompanying fission of egg. Mathematical treatment of the subject.—*Chas. B. Davenport.*

575. FLORIN, CARL, AND RUDOLF FLORIN. "P. J. Bergius," en ny äpplesort. ["P. J. Bergius," a new kind of apple.] *Acta Horti Bergiani* Stockholm 6^o: 1-6. 1 pl., 1 fig. 1919.—A scion was taken from an old Säfstaholm apple-tree. The branch that was developed from this scion produced fruits which did not show the rosy-colored stripes on green-white ground, which are so characteristic for the Säfstaholm apple. The apples were on the contrary colored intensively and uniformly dark red on all sides. A colored picture of this new fruit is attached to the paper.—Scions taken from this new sort of apple-tree have all given apples of the same kind.—The pollen of the new variety has considerably less power of germination than that of the common Säfstaholm apple. Parthenocarpy seems not to take place; the "P. J. Bergius" apple ought consequently not to be planted in great groups, but between other sorts of apples with pollen more capable of germination.—*K. V. Ossian Dahlgren.*

576. FRIES, THORE C. E. *Antennaria alpina* (L.) Gaertn. och dess skandinaviska elementararter. [*Antennaria alpina* and its scandinavian elementary species.] *Svensk Bot. Tidskr.* 13: 179-193. 1 fig. 1919.—A list of all the rare finds in Scandinavia of ♂ individuals of the apogamous *A. alpina* is given. Author has moreover found two of the elementary species described from Greenland, viz., *A. intermedia* (Rosenv.) Pers. and *A. glabrata* (J. Vahl) Pers. in Swedish Lapland. Author gives a discussion of the arrival to and spreading in Scandinavia of the ♂ form of *A. alpina*. Seeds are of course never formed and an effective spreading by means of sterile rosettes or leaves is hardly to be thought of. The possibility that the ♂ individuals are not constant males in all circumstances, but that certain conditions may induce them to form seeds, is pointed out. The possibility of an "atavistic" production of males from the apogamic ♀ individuals is looked upon as rather improbable in the light of modern study of inheritance.—*K. V. Ossian Dahlgren.*

577. FRUWIRTH, C. Zum Verhalten der Bastardierung spontaner Variationen mit der Ausgangsform. [The behavior of the hybridization of a spontaneous variation with the original form.] *Zeitschr. Pflanzenzücht.* 7: 66-73. 2 fig. June, 1919.—See Bot. Absts. 4, Entry 2224.

578. GASSUL, R. Eine durch Generationen prävalierende symmetrische Fingerkontraktur. [A symmetrical contraction of the fingers prevailing through generations.] *Deutsch. med. Wochenschr.* 44: 1197-1198. 2 fig. 1918.—See also Bot. Absts. 4, Entries 2229, 2230.

579. GERVAIS, PROSPER. [Rev. of: ROUART, EUGENE, AND LOUIS RIVES. Les hybrides producteurs directs pour la reconstitution du vignoble. (The hybrid direct-producers for the reconstitution of viticulture.)] *Compt. Rend. Acad. Agric. France* 5: 293-297. 1919.

580. GLEASON, H. A. Variability in flower-number in *Vernonia missurica* Raf. Amer. Nat. 53: 526-534. Nov.-Dec., 1919.—Statistical study of a few plants indicates number of flowers to be greatest in terminal heads of each cyne. Range of variability of flower number is smaller for individual plants than for entire population.—*Helene Boas Yampolsky*.

581. GLEASON, H. A. The history of the London plane. Jour. New York Bot. Gard. 20: 216-220. Nov., 1919.—Largely extracts from "The history of the London plane" by A. HENRY AND M. G. FLOOD in Proceed. Royal Irish Acad. Describes in some detail history of the London plane, *Platanus acerifolia*, usually regarded in the United States as *Platanus orientalis*. Former is common street tree, has remarkable vigor, and is very resistant to smoke, drought and other unfavorable city conditions. *P. orientalis* is rarely planted as street tree. London plane probably a first-generation hybrid between *P. orientalis* and *P. occidentalis*, which explains its remarkable vigor and the great variability of its seedlings, part of which are similar to supposed parents, and part combine characters of both parents in various ways. Possibly originated at Oxford Botanic Garden about 1670 from chance hybridization. Experimental proof for this assumption could be obtained in the United States where adult trees of both natural species are to be found.—*O. E. White*.

582. GODFREY, M. J. The problem of the British orchids. Jour. Botany 57: 137-142. 1919.—See Bot. Absts. 3, Entry 148.

583. GOETZ, E. Tabakanbauversuche. [Tobacco culture investigations.] Badisches Wochenbl. 1919: 67-69. 1919.

584. GOUVEIA, J. T. Climatic conditions as indicated by land shells on the island of Oahu. Nautilus 33: 89-92. Jan., 1920.—Discusses differences in distribution of dextral and sinistral shells of *Achatinella cestus*.—*J. Arthur Harris*.

585. GOWEN, J. W. Variations and mode of secretion of milk solids. Jour. Agric. Res. 16: 79-102. 1919.—A study based on the advanced registry records of the Holstein-Friesian Association. The mean, standard deviation, and coefficient of variation are given for quantity of milk produced in a year, age, quantity and percentage of butter fat and solids-not-fat. The average constitution of Holstein-Friesian milk as thus found is compared with the available data from other breeds of cattle and from other kinds of mammals. A slight, but significant, negative correlation (-0.098 ± 0.016) is found between quantity of milk and percentage of butter fat. The correlation between quantity of milk and percentage of other solids is also negative (-0.066 ± 0.037) but not significant, being smaller as well as based on fewer cases. Age is not found to be correlated to a significant extent with percentage of butter fat (-0.055 ± 0.018) but is correlated (negatively) with the percentage of other solids (-0.019 ± 0.035). The quantity of butter fat and of solids-not-fat are found to vary together, the partial correlation between them for a constant amount of milk, being $+0.564 \pm 0.025$. Data are presented on the difference in the constitution of milk in the morning and evening. Evening milk is found to be distinctly the richer in fat content but not appreciably different in solids-not-fat. The bearing of the data on the different theories of milk production is discussed. It is held that they favor the theory that milk is produced by secretion and not by cell disintegration.—*Sewall Wright*.

586. GOWEN, J. W. Report of progress on animal husbandry investigations in 1917. Maine Agric. Exp. Sta. Bull. 274: 205-228. 2 pl., 1 fig. 1918.—(1) Analysis of milk records: Relation of age to milk and fat production in Guernseys was studied, using correction factors found; influence of sires was studied on the basis of production of daughters compared to production of dams of these daughters.—(2) Variations and mode of secretion of milk solids: Short account of investigations, results of which have been published in Journal of Agricultural Research. 16: 79-105. 1919.—(3) Cattle judging as a means of selecting cows for the herd: Study was made of correlation between milk production and scores of 672 cows. Conclusion is reached that high-producing cows can be selected by external conformation only when two

to three years old.—(4) Breeding experiments: Full report of these experiments published in Bull. 272, Maine Agr. Exp. Sta.—(5) Inheritance of twinning and problems connected therewith: Observations on a free martin led to following conclusions: Free martin can come in heat; heat can appear in cattle having gonads very different in appearance from those of either normal sex; and growth or release of egg is not cause of heat.—(6) Coöperative cattle breeding records: Out of 2573 births, 21 were twins. Combining data concerning sex with data of Lillie, the ratio is 22 pairs where both are males to 38 pairs of one male and one female to 15 with both females, thus approaching closely a 1:2:1 ratio.—*E. Roberts.*

587. GRABNER, E. Ausleseverfahren zur Massenauslese der Maiskolben. [Selection experiences in the mass-selection of maize ears.] Zeitschr. Pflanzenzücht. 7: 61-63. 1 fig. June, 1919.—A method of sorting maize ears for seed into grades according to total weight of ear and per cent weight of grain in total weight of ear. Ears having above 89 per cent grain are divided into 6 classes according to total weight of ear, ranging from 200 to 500 grams. Specimens weighing above 450 grams and having a per cent of grain higher than 89 are put in first grade. Table shows per cent of grain for ears of any given total weight, from 200 to 500 grams, and weight of cob. Several years' selection in this way raised grain percentage from 65 to 68 in common maize to S2 to S3 which is figured to give an increase of 15 to 19 per cent in production of grain.—*D. F. Jones.*

588. HAECKER, V. Die entwicklungsgeschichtliche Vererbungsregel in der Völkerkunde. [The ontogenetic law of heredity in anthropology.] Zeitschr. induct. Abstamm. Vererb. 19: 73-78. 1918.—Two types of heredity manifest themselves following a cross between distinct races of men. With some traits segregation occurs, with others it does not. The traits that segregate are believed to be the ones which owe their character to a simple causal factor and which have a high degree of autonomy in development. Those that do not segregate but form permanent blends are the traits of a more complicated genesis and of a low degree of autonomy. Most features of the head and face are due to multiple ontogenetic reactions since the determining elements of soft tissues and bone are subject during development to the interplay of complex pressures and tensions exerted by other parts. In southeastern Europe the original Mongolian characteristics of Magyar and Turk have been diluted almost to the point of complete obliteration in so far as most traits,—those of complex origin,—are concerned, but at least one character, the "Mongolian spot," frequently appears in full strength. The development of the latter is comparatively a simple process, merely the localized deposition of pigment, hence its independent segregating behavior in heredity. Similarly one may explain the rather common occurrence of more or less dark-skinned people with blue eyes, skin color being a complex, blending trait, eye color a simple, segregating trait. Author does not commit himself as to whether blending traits, in whose development multiple ontogenetic factors are involved, do or do not owe their peculiarities to multiple genes in the usual sense.—*C. H. Danforth.*

589. HAGIWARA, T. Asagao no Ha no hutatu no Seisitu no aidano Sôkwankwandkei ni tuite. [On the correlation between two leaf-characters in the Japanese morning-glory.] [In Japanese.] Nôgakukwaihô [Report of the Agronomical Soc.] 206: 897-901. Tôkyô, 1919.—A cross was made between a race of the Japanese morning-glory (*Convolvulus*) having green leaves with their margins rolled upwards and another having variegated ones with ordinary flat margin. F₁ possesses full green leaves with ordinary flat margin. In F₂ each of these allelomorphous pairs—full greenness and variegation, flat and rolled margin—when independently considered, is found to segregate respectively in typical 3:1 fashion; but when both of them are taken together into consideration, the ratio of the four kinds of zygotes produced, i.e., green-flat, green-rolled, variegated-flat, variegated-rolled, is quite different from the usual 9:3:3:1 and the author's conclusion drawn from their respective numbers—252:26:27:69—is that he has here to do with a case of linkage of the two allelomorphous pairs above cited in the gametic ratio 7:1:1:7.—*S. Ikeno.*

590. HALDANE, J. B. S. The probable errors of calculated linkage values, and the most accurate method of determining gametic from certain zygotic series. *Jour. Genetics* 8: 291-297. Sept., 1919.—Assuming Bayes's theorem to be accurate, this paper derives probable error formulae for linkage and reduplication values calculated from the offspring of crosses of types AB. $ab \times ab$ ab , Ab. $aB \times ab$ ab , AB. $ab \times AB$. ab and Ab. $aB \times Ab$. $aB \times Ab \times aB$.

If the cross is $Aa Bb \times aa bb$ where n equals total number of zygotes obtained, P the observed value of p in a heterozygote $Aa Bb$ producing gametes in the proportion $\frac{p}{2} AB: \frac{1-p}{2} Ab: \frac{1-p}{2} aB: \frac{p}{2} ab$, the probable error of P is

$$0.6745 \sqrt{\frac{P(1-P)}{n}}$$

of the observed X (coefficient in gametic series in case of coupling)

$$0.6745 (X + 1) \sqrt{\frac{X}{N}}$$

of the observed Y (coefficient in gametic series in case of repulsion)

$$0.6745 (Y + 1) \sqrt{\frac{Y}{N}}$$

Considering the F_2 zygotic series obtained by *inter se* mating of F_1 zygotes the expected proportions of which are

$$\frac{2+p^2}{4} AB: \frac{1-p^2}{4} Ab: \frac{1-p^2}{4} aB: \frac{p^2}{4} ab.$$

Put $t = p^2$, let t_a be an approximate value of t , while $T = t + \delta$ the most probable value from observation. T_1, T_2, T_3, T_4 be the four values of t calculated from the four observed classes observed.

$$t_1 = \frac{4 (AB)}{n} - 2$$

$$t_2 = 1 - \frac{4 Ab}{n}$$

$$t_3 = 1 - \frac{4 (aB)}{n}$$

$$t_4 = \frac{4 (ab)}{n}$$

Hence

$$T = \frac{3t_a t_1 + (2 + t_a) t_4}{2 + 4 t_a}$$

while $P = \sqrt{T}$

for t_a take t_4 in repulsion or $\frac{1}{2} (t_1 + t_4)$ in coupling.

Hence

$$\text{probable error of } T = 0.477 \sqrt{\frac{4T(2+T)(1-T)}{n(1+2T)}},$$

$$\text{probable error of } P = 0.477 \sqrt{\frac{(2+p^2)(1-p^2)}{(1+2P^2)n}},$$

$$\text{probable error of } X = 0.477 (X + 1) \sqrt{\frac{(3X^2 + 4X + 2)(2X + 1)}{(3X^2 + 2X + 1)n}},$$

$$\text{approximately } 0.6745 (X + 1) \sqrt{\frac{X + 7/6}{n}},$$

$$\text{probable error of } Y = 0.477 (Y + 1) \sqrt{\frac{(2Y^2 + 4Y + 3)Y(Y + 2)}{(Y^2 + 2Y + 3)n}},$$

$$\text{approximately } 0.6745 \frac{(Y + 1)^2}{\sqrt{n}}.$$

These results are employed to show that F_2 is almost as accurate a means of measuring linkage as are the offspring from $F_1 \times$ double recessive; it is also slightly more sensitive as a means for the detection of linkage.—*John W. Gowen.*

591. HALDANE, J. B. S. The combination of linkage values, and the calculation of distances between the loci of linked factors. *Jour. Genetics* 8: 299-309. 1 fig. Sept., 1919.—Using the data contained in "Sex-linked inheritance in *Drosophila*" by Morgan and Bridges a curve is derived of the equation

$$x = 7y - \frac{3}{2} \text{Log. } e (1 - 2y),$$

where x = distance, y = crossover value in 100 times the unit in ordinary use ("Morgan"), to describe the relation of observed crossover value for two factors in comparison with the actual distance were all crossovers.—From this equation it is shown that if A, B, and C are three factors lying in a chromosome in that order, and if m is the crossover value for A and B, n that for B and C, then the value for A and C lies between $m+n$ and $m+n-2mn$, being nearer the former when $m+n$ is small, to the latter when it is large.—To explain these results the hypothesis of a partly rigid chromosome is urged.—The relation between crossover value and distance permits the calculation of one of the crossover values for three factors from the other two with a probable error of less than 2 per cent.—The results above cited are used to show the incompatibility of Trow's form of the reduplication theory.—*John W. Gowen.*

592. HARALDSON, C. Report of the Fruit Breeding Farm, Zumbra Heights. Minnesota Sta. Rept. 1918: 94-98. 1918.—A report of progress in fruit breeding. Promising varieties of strawberry, plum and apple, have been numbered and recommended for trial. Selections are made only from the most hardy sorts. Additional crosses have been made in plum, raspberry, strawberry, apple, blackberry and dewberry.—*M. J. Dorsey.*

593. HARLAN, H. V., AND H. K. HAYES. Breeding small grains in Minnesota. II. Barley investigations. Univ. Minnesota Agric. Exp. Sta. Bull. 182: 45-56. Fig. 11-14. Mar., 1919.—Minnesota ranks second as a producer of barley. Prior to 1915 there were two barley breeding nurseries at the Minnesota Experiment Station Farm, one operated by the Office of Cereal Investigations, Bureau of Plant Industry, the other operated by the Minnesota Experiment Station. In 1915 the work of the two sets of barley investigations was combined. The averages of oats for 68 selections and crosses are given in tabulated form, together with botanical types and agronomic characters. Three superior barleys survive a large number of field selections. These are Featherston, Lake City and Excelsior. The Manchuria selections showed some to be superior to others. One of the highest breeders from these selections was propagated for field growing. As wide variations in yielding-ability was found in the Manchuria variety as are ordinarily obtained when comparing different varieties. As the result of crosses, superior smooth-awned barleys have been produced. The smooth awn character was obtained from Lion, a smooth-awned black parent, and Manchuria, a standard variety. The smooth-awned types produced are illustrated by cut showing variations in types as the

result of the cross. Further work with smooth-awned sorts is under way. A cross between Manchuria and South African, a low-yielding, stiff-strawed variety, has given two selections of high yielding-ability and stiffer straw than the Manchurian parent. Results reported show necessity of severely testing new products in various state localities before distributing the same.—*Alvin Kezer.*

594. HARLAND, S. C. The improvement of the yield of Sea Island cotton in the West Indies by the isolation of pure strains. Pt. II. West Indian Bull. 17: 210-236. 1919.—For first part of this paper see Bot. Absts. 3, Entry 359. Second part deals with inheritance of length of fiber, weight of fiber per seed (lint index) and per boll, and weight of seed. Selection in a mixed stock for increased values for these characters gave positive results up to a certain point, when homozygosity was probably attained, since thereafter selection was apparently ineffective. A high positive correlation was found to exist between weight of fiber and weight of seed, and between weight of fiber per seed and per boll and yield of fiber per acre. Length of fiber and weight of fiber appear to be negatively correlated.—*T. H. Kearney.*

595. HARRIS, J. ARTHUR, AND FRANCIS G. BENEDICT. Biometric standards for energy requirements in human nutrition. Sci. Monthly 1919: 385-402. 8 fig. May, 1919.—This paper is a more popular treatment of a technical paper. The data on the basal metabolism of 136 men, 103 women, 51 male infants and 43 female infants were used. The aim of the investigation was to determine the most accurate means of predicting from physical measurement what the normal basal metabolism of an individual should be. The determination of these basic equations involved the calculation of the correlations between body weight, stature, and age in relation to each other and to basal metabolism. From the multiple correlations of these variables the prediction equations for basic metabolism involving body weight, stature and age are determined. Those equations are shown to be accurate within an average plus or minus error of 5.30 per cent.—Illustration of the use of these equations is given for diabetic, vegetarian, and sex data on basal metabolism. The conclusions are that diabetes increases the basal metabolism of the affected individual 11.55 per cent; no difference in the basal metabolism of the vegetarian is noted; women have a lower basal metabolism than men. The difference in the basal metabolism of men and women is not evidenced by these data in infancy, but is in old age.—*John W. Gowen.*

596. HARRISON, J. W. HESLOP. Studies in the hybrid *Bistoninae*. III. The stimulus of heterozygosis. Jour. Genetics 8: 259-265. 2 fig. Sept., 1919.—Hybrids between different genera show that, as the phylogenetic differences in the forms united increased, there was a concomitant and proportional increase in physiological robustness of the hybrid organism expressed in: (1) a size increased beyond the theoretical expectation; (2) an acceleration in the speed of feeding up of the larvae; (3) great disease-resisting powers; (4) an enormous reduction of the time of lying over. Wing expanse larger by from 2 to 8 per cent in a series of crosses. Cell size greater in one hybrid examined. Heterosis in this material is considered to be directly dependent on the cumulative differences between the factors building up the various genotypes and due to a physiological stimulus arising from either the reaction of male nucleus in female cytoplasm, or the heterogeneous nature of the zygote with respect to the genes, or to the presence in a given cell of a greater number of units than it was designed to receive. The reaction of other than Mendelian factors is thought to assist in the process. Most of the hybrids are sterile but one exception gave great variability in the second generation. Attention is called to the hybrid vigor, in itself, as an agency in increasing variability in segregating generations.—*D. F. Jones.*

597. HARRISON, J. W. HESLOP. Studies in the hybrid *Bistoninae*. IV. Concerning the sex and related problems. Jour. Genetics 9: 1-38. 1 pl., 10 fig. Dec., 1919.—The wingless ♀ of *Nyssia zonaria*, a European geometrid with 56 chromosomes (haploid number) produces only male offspring (with the few exceptions noted below) when crossed with the ♂ of any of the following species:

- | | |
|---|---|
| (1) <i>Poecilopsis lapponaria</i> | { Immediate phylogenetic source of <i>N. zonaria</i> . <i>P. lapponaria</i> was probably derived from <i>Lycia hirtaria</i> .
Females normally wingless. |
| (2) <i>Poecilopsis rachelae</i> | |
| (3) <i>Poecilopsis pomonaria</i> , 51 chromosomes | { More recently derived from <i>L. hirtaria</i> .
Females wingless. |
| (4) <i>Poecilopsis isabellae</i> , 52 chromosomes | |
| (5) <i>Lycia hirtaria</i> (Stem-form of the group. ♀ winged. 14 chromosomes). | |

The exceptions are (1) that in the cross involving ♂ *P. rachelae* a few intersexes occur in the brood of male offspring.—(2) When any of these ♂♂ (except *L. hirtaria*) comes from inbred stock, a few female offspring are produced with the males, e.g., *P. pomonaria* ♂ gave 7 ♀♀, 71 ♂♂; 3 ♀♀, 62 ♂♂. (3) A half-size ♀ was obtained in addition to males from *N. zonaria* ♀ × (*P. pomonaria* ♂ × *isabellae* ♀).—The ♂ *N. zonaria*, on the contrary, in corresponding reciprocal crosses gives normal sex ratios, a slight excess of ♀♀ being usual. Another ♀ *Nyssia*, *N. graecaria* ♀ × *L. hirtaria* ♂ also produces only males, and the closely allied North American *P. rachelae* ♀ × *L. hirtaria* ♂ gives only males and intersexes.—Interpretation: The female being the heterozygous sex in Lepidoptera, both male and female-producing eggs are formed by ♀ *N. zonaria*, the phylogenetically youngest member of this group of species. These eggs are presumably (not demonstrably) distinguished by an X or a Y chromosome. The superior potency, or (quasi-electric) sex potential, of the sex factors or chromosomes, X', X', of the various sexually homozygous males of these "phylogenetically older" species forces the resulting X'Y zygotes (50 per cent) out of femaleness into maleness, except in those cases in which the potential of the sex factor of the male was lowered by previous inbreeding, whereby a few females remain untransformed, or, as in the cross involving *P. rachelae* ♂, a few intersexes occur with the males. In the interesting case of the ♀ of half-size, supplementary to the male offspring from *N. zonaria* ♀ × (*P. isabellae* ♀ × *P. pomonaria* ♂) ♂, the male parent was extraordinarily large and vigorous. The pygmy daughter is supposed to be the result of a dislocation of the XY chromosomes in the first cleavage so that, for example, instead of dividing and being distributed to each pole, one passes undivided to each daughter nucleus. If the resulting XO cell is non-viable, the other (YO) of female tendencies alone controls development of the supposed half embryo, regenerating a diminutive whole. Another method of chromosomal dislocation with similar outcome is mentioned.—The extraordinarily large proportion of males (190:14) from *L. hirtaria* ♀ of Scotch origin × *P. pomonaria* ♂, whereas this cross made with a ♀ *hirtaria* of English stock gives a normal ratio (e.g. 86 ♂♂; 75 ♀♀) is ascribed to a physiological "racial variation of the powers of the sex determiners," and inadvertently compared to cases like *zonaria* ♀ × *hirtaria* ♂ giving only males. Intersexes only are the product of the ♀ F₁ hybrid (*P. pomonaria* ♀ × *L. hirtaria* ♂) × *P. pomonaria* ♂. Genitalia of seven are described, and figures of the wings shown.—Interpretation: No reduction division is assumed to occur in gametogenesis of the hybrid mother. Her gametes thus carry X'Y (X' from the *hirtaria* ♂) and those of the *pomonaria* ♂ bring X, forming zygote XX'Y, essentially ♀ but maladjusted by the presence of X' and other supernumerary chromosomes. Chromosomal dislocations in mitosis at different stages of cleavage are assumed to explain the individual differences in sexual and somatic characters of the various fundamentally female gynandromorphs.—Finally the genitalia of an intersex (chiefly ♀) from *P. lapponaria* ♀ × *P. pomonaria* ♂, which occurred in a brood with normal sex ratio, are described.—J. H. Gerould.

598. HAYES, H. K., AND R. J. GARBER. Breeding small grains in Minnesota. I. Technic and results with wheat and oats. Univ. Minnesota Agric. Exp. Sta. Bull. 182: 1-44. 10 fig. Mar., 1919.—Methods of technique, together with the history as practiced at the Minnesota Experiment Station, are outlined, for new introductions, straight selections and crosses. At Minnesota, the centgener plan of breeding, or straight selection, was apparently practiced from 1908 to 1914. New introductions were prolifically made from 1915 to 1917. Both spring and winter wheats are treated, giving varieties, methods and accomplishments. There is much tabular matter on the behavior of winter wheat at Grand Rapids and Waseca and averages for all stations. For spring wheat, results are given for University Farm, Crookston,

Morris, Waseca and general averages for all stations. The behavior of a number of Durum varieties is recorded for different Minnesota stations. Treatment is given for oats and their performance for different agronomic characters, such as yield, lodging, date of maturity, quality of grain. Crosses are reported to be made between parental sorts selected because of some particular desired characters. Methods of obtaining homozygous segregates by selection and bulk work are outlined. Mathematical formulae are given for the length of time or number of generations to make a cross automatically homozygous.—*Alvin Kezer.*

599. HAYES, H. K., AND R. J. GARBER. Synthetic production of high-protein corn in relation to breeding. Jour. Amer. Soc. Agron. 2: 309-318. 1919.—The authors believe that there are almost unlimited opportunities of improving corn by an application of the principles learned in inbreeding and crossbreeding. An experiment is outlined for the synthetic production of high protein corn by self-fertilization, crossing and subsequent selection. Three F_1 crosses between high-protein strains were studied in 1918 and were compared with Minnesota No. 13 which was the original source of the selfed strains. They gave an increase in average protein content of a little over 2 per cent as compared with Minnesota No. 13 and also yielded better.—*F. M. Schertz.*

600. HAYES, H. K., AND P. J. OLSON. First generation crosses between standard Minnesota corn varieties. Univ. Minnesota Agric. Exp. Sta. Bull. 183. 22 p., 2 fig. Aug., 1919.—With a series of twelve crosses the authors have found the first generations exceeded the average of their parents, and in many cases the better parent, in yield of grain. In general the first generations were intermediate between the parents in maturity, height of plant, ear length and shelling per cent. The number of rows on the ears, however, were below the average of the parents in flint-dent crosses. The authors state that properly stored two-year-old seed may be expected to yield as well as similarly treated 1-year-old seed and better than 1-year-old seed which is not well ripened.—*J. H. Kempton.*

601. HEGNER, ROBERT W. The effects of environmental factors upon the heritable characteristics of *Arcella dentata* and *A. polypora*. Jour. Exp. Zool. 29: 427-441. 7 fig. Nov. 20, 1919.—In studying efficacy of selection as means of isolating heritably diverse lines within a clone of *Arcella dentata*, and in studying nucleo-cytoplasmic relation in this species and in *A. polypora*, experiments were performed to determine effects of environmental factors upon heritable characteristics of these organisms.—It was found that underfeeding retards the fission rate from an average of one division every 2.50-day period to one every 4 days; that shell diameter decreased, on the average, 2.68 units of 4.3μ each, and that there was a slight decrease in spine number.—The addition of one drop of sodium silicate to each 100 cc. of water decreased fission rate to same extent as underfeeding. Size is reduced, spines are almost entirely absent and usual brown shell color is replaced by greenish yellow.—Alcohol proved injurious to *A. dentata* though they are able to grow and reproduce in media containing from 0.25 to 1 per cent alcohol. It retarded fission rate and caused irregularities in shells.—There is some evidence that the lower the temperature the smaller become the spines of *A. dentata*.—Wild specimens of *A. polypora* having a bent oval shell with oval mouth, were found. These, under laboratory conditions, produced entirely normal later generations. The bent oval condition is probably due to unknown environmental factors.—Modifications produced by above environmental factors persist only so long as those factors are operative; therefore no heritable diversities due to the changed conditions were produced.—*A. R. Middleton.*

602. HEGNER, ROBERT W. The relations between nuclear number, chromatin mass, cytoplasmic mass and shell characteristics in four species of the genus *Arcella*. Jour. Exp. Zool. 30: 1-95. 47 fig. Jan. 5, 1920.—Protozoan genus *Arcella* is favorable for genetic research because germinal substratum and somatic characteristics are observable in living specimens; chromatin is in compact spherical mass at center of nucleus permitting quantitative observations; *Arcellas* are also able to withstand severe operations.—In *Arcella dentata* excised portion of shell is not regenerated. Removal of part of cytoplasm is followed in next gener-

ation from nucleated part by smaller daughter cell but original size for clone is regained in granddaughter cell. Portions may be removed repeatedly but as long as some of shell remains with nucleus and cytoplasm progeny will eventually regain characteristics typical for clone. Removal of part of chromidial net was without perceptible after-effect in these experiments. Bisection of binucleate specimens 15-spined and 35 units in diameter led eventually to uninucleate clones averaging 11 spines and 25 units in diameter; uninucleate condition usually persisted for from 6 to 33 generations. Return to binucleate condition occurred with empty cell formation, nuclear doubling seeming to have been initiated when cytoplasmic mass became greater than quantity normally associated with one nucleus. Restoration of binucleate status was *gradually* followed by cytoplasmic increase until after 3 or 4 generations nucleo-cytoplasmic relation of original binucleate line was attained, that is, a single great internal change is paralleled in soma by series of *small* changes in a definite direction (orthogenetic variation apparently). Observations of small changes, gradually accentuated in successive generations, in other protozoa can be interpreted as due to single discontinuous genotypic change only slowly influencing soma. In both uninucleates and binucleates there is a correlation between spine number and shell diameter of over 40 per cent. Two binucleate clones differed in shell diameter and larger was found to contain larger total mass of chromatin in each specimen than smaller.—In *Arcella polyzona* examination of 54 wild specimens showed that nucleus number ranged from 3 to 10 with modal number 5; correlation between nuclear number and shell diameter among these wild individuals was low (0.156 ± 0.089). Diameters of different clones with same number of nuclei might differ; specimens of clone ap5, the diameters of whose members was large in comparison with number of nuclei, had large chromatin masses, while those of clone ap34, where the individual diameters were small compared to number of nuclei, possessed smaller chromatin masses. Within one large clone (family ap5) selection for large and small diameters was successful but the small-diametered sub-clone was found to be 4-nucleated while the larger-diametered sub-clone had 5- or 6-nucleated cells; in general within this clone there was a high correlation of diameter and number of nuclei (0.81 ± 0.023).—*Arcella discoides* resembled *A. dentata* in showing a smaller range of variation than *A. polyzona*, which is associated with a constancy of nuclear number in first two species (2 nuclei in each). Biotypes of *A. discoides* with different average diameters were isolated from nature. Uninucleate specimens made by bisecting revealed relationships similar to those reported for *A. dentata* when compared with binucleates.—In *A. vulgaris* shapes as well size distinguished lines isolated from nature; variability resembled that in *A. dentata* and *A. discoides*.—Brief survey of development of conception of nucleo-cytoplasmic relation and of chromatin-cytoplasmic relation is presented and bearing of *Arcella* results is indicated.—James P. Kelly.

603. HEINRICH, M. Der Einfluss moderner Reinigungsanlagen auf die Güte des Saatguts. [The influence of modern cleaning devices on the goodness of the seed.] Zeitschr. Pflanzenzücht. 7: 19-30. 4 fig. June, 1919.—Shows use of modern cleaning devices with oats increases test weight, purity, percentage germination, and percentage strong healthy seedlings.—Fred Griffee.

604. HENNINGS, HANK. Mnemelehre oder Tierpsychologie? [The mneme theory or animal psychology?] Biol. Zentralbl. 39: 187-192. April, 1919.

605. HERLANT, MAURICE. Comment agit la solution hypertonique dans la parthénogénèse expérimentale (Méthode de Loeb). I. Origine et signification des asters accessoires. [How the hypertonic solution acts in experimental parthenogenesis (Method of Loeb). I. Origin and significance of the accessory asters.] Arch. Zool. Exp. et Gén. 57: 511-533. Nov., 1918.—Hypertonic solutions cause artificial parthenogenesis in sea urchin eggs by providing accessory asters. Monasters produced in activated egg before application of hypertonic solution are ineffective; accessory asters make efficacious bipolar mitosis possible. Capacity of solution for causing development of eggs depends on concentration and composition. NaCl, KCl, and OH ions favor accessory asters; CaCl₂ and MgCl₂ are neutral or inhibitory; H ions, KCN,

and anesthetics prevent cytasters. Agents alter permeability of egg membrane. Cytasters are produced artificially only during period of permeability of egg membrane. Author suggests salts penetrate egg at this time, become irregularly distributed in egg, and "salted" spots become centers of coagulation and liquefaction of colloids, thus forming asters.—A. Franklin Shull.

606. HERLANT MAURICE. Comment agit la solution hypertonique dans la parthénogenèse expérimentale (Méthode de Loeb). II. Le mécanisme de la segmentation. [How the hypertonic solution acts in experimental parthenogenesis (Method of Loeb). II. The mechanism of segmentation.] Arch. Zool. Exp. et Gén. 58: 291-314. Pl. 13-14. July, 1919.—Egg of *Paracentrotus lividus* stimulated to development by butyric acid alone forms monaster or several monasters one after another at successively shorter intervals and of successively shorter duration, but egg does not divide. Nucleus disappears while monasters are present but reappears, each time of larger volume, after each monaster, and toward end of series of monasters it may be fragmented. Fixed material shows that chromosome number, normally 18, doubles each time monaster is formed, but no cell division occurs and all chromosomes are recombined into one nucleus of larger size. Frequently at time of third or fourth monaster small spindle, perhaps in nucleus, is formed with very large number of chromosomes on its equator, in which condition egg remains until it disintegrates. In eggs treated first with butyric acid, then returned to sea water, and finally for 30 minutes to hypertonic solution, accessory asters are formed in addition to aster near nucleus. If only one accessory is formed it approaches the perinuclear aster, spindle is formed, and egg divides. Presence of two or more accessory asters may result in irregular divisions. Aster is physiological, not morphological phenomenon. Review of literature indicates most features of mitosis are largely independent of each other, and none is indispensable.—A. Franklin Shull.

607. HERTWIG, PAULA. Keimesschädigung durch Physikalische und chemische Eingriffe. [Injury of the germ cells by physical and chemical means.] Zeitschr. indukt. Abstamm. Vererb. 19: 79-99. Mar., 1918.—Author gives a short review of the most important recent contributions to the study of injurious effects of physical and chemical factors on development of germ cells.—She discusses briefly experiments of O. BURY (1912) on eggs of Echinids with low temperature; those of O. HERTWIG (1913) on spermatozoa of *Rana fusca* and *Rana esculenta* with solutions of different chemical substances (methylenblue, eosin, fuchsin, atoxyl, sublimate, chloralhydrate, etc.); those of G. AND P. HERTWIG (1913) on germ cells of amphibia and fishes with different chemical substances (chloralhydrate, strychnine, nicotine, methylgreen, etc.); those of C. HERBST (1907 and 1913) on spermatozoa with radium solutions; those of O. WARBURG (1910) with ammonia and thymol solutions; those of MAIRET AND CAMBERMAL (1888) with alcohol; and those of NICE (1912) with alcohol, nicotine, tobacco smoke and caffeine. The general results of these experiments are stated in a few words.—The greater part of the article is devoted to a special consideration of the experiments by STOCKARD (1910, '12, '14), STOCKARD AND CRAIG (1912), and STOCKARD AND PAPANICOLAOU (1916) on the action of alcohol on the germ cells of mammals. She considers these experiments to show conclusively the modification of the germ cells in mammals by chemical stimuli, but doubts whether the differences in results from treated males and females will continue to be significant after greater numbers are studied.—The article is as a whole a fair review of the papers considered.—George N. Papanicolaou.

608. HESSING, J. Mitteilungen bezüglich der Variabilität einiger Grasarten. [Communications concerning the variability of some grass species.] Zeitschr. Pflanzenzücht. 7: 53-57. June, 1919.—Marked variability in characters of *Lolium italicum* and *L. perenne*. Selfing three years isolated 3 groups, tall V-form, bushy U-form and low spreading plants each of which bred nearly true. Data are given on breadth and length of leaf and spike density. Author holds that selfing and individual-plant study is correct method of breeding these grasses.—R. J. Garber.

609. HIGGINS, J. EDGAR. Report of the horticultural division. Hawaii Agric. Exp. Sta. Rept. 1918: 7, 8, 13-21. Pl. 2, 3. 1919.—See Bot. Absts. 4, Entry 971.

610. HILSON, G. R., AND F. R. PARNELL. A simple method of selfing cotton. Madras Agric. Yearbook 1917: 54, 55. 1918.—Method consists of sewing unopened flower bud near tip, passing thread also through involucre so that when corolla falls it remains attached to involucre, thus marking flowers which have been selfed.—T. H. Kearney.

611. HINDLE, EDWARD. Sex inheritance in *Pediculus humanus* var. *corporis*. Jour. Genetics 8: 267-277. 1 chart. Sept., 1919.—Breeding experiments with the clothes-lice were begun in 1912 but later were interrupted by the war and consequently are not very extensive. Pairings were made and the resulting families were composed, in some experiments, of nearly all male individuals, in some experiments of nearly all female individuals, while in others the two sexes occurred in about equal numbers. It was suggested that there were two kinds of females and two kinds of males according to their inherent capacity to produce male or female offspring. During these experiments the lice were fed upon the human arm.—D. D. Whitney.

612. HODGSON, ROBERT W. An avocado monstrosity. California Citrograph 5: 14-15. 1 fig. Nov., 1919.—Author describes seedling with the leaves near the apex of main stem remarkably malformed, consisting of irregular masses of white fleshy tissue. No evidence of injury by insects or fungi; bud mutation suggested as possible cause of abnormality.—Howard B. Frost.

613. HOFFMANN, HERMANN. Zum Problem der Vererbung erworbener Eigenschaften. [The problem of inheritance of acquired characters.] Med. Klinik 15: 583-586.

614. HOLLÄNDER, EUGEN. Familiäre Fingermissbildung (Brachydaktylie und Hyperphalangie). [Familial abnormalities of the fingers (brachydactyly and hyperphalangy).] Berlin Klin. Wochenschr. 55: 472-474. 1918.

615. HOLLICK, A. The story of the Bartram oak. Sci. Amer. 121: 422, 429-430, 432. 6 fig. 1919.—The Bartram oak, after 175 years of doubt and controversy, is conclusively proven to be a hybrid, with the willow oak and the red oak as the two parent species.—Chas. H. Otis.

616. HOLMGREN, I. Zytologische Studien über die Fortpflanzung bei den Gattungen *Erigeron* und *Eupatorium*. [Cytological studies on reproduction in the genera *Erigeron* and *Eupatorium*.] K. Svenska Vet. Akad. Handl. 59⁷: 118 p., 24 fig. 1919.—The two nearly related species *Erigeron eriocephalus* and *E. unalaschkensis* differ from each other both in the number of chromosomes and in the evolution of the embryo sac. (All described types of evolution of the embryo sac of the Compositae are to be found in the genus *Erigeron*.)—*Erigeron annuus* is apogamous; within the genus *Erigeron* are to be found diploid, triploid, tetraploid and hexaploid species with nine chromosomes as cardinal number. These numbers and the appearance of the chromosomes is discussed in detail. Author believes that crossing has taken the greatest part in the origin of species.—*Eupatorium glandulosum* produces seeds even after castration. Eight sexual species of the same genus are also examined. The evolution of the reproductive cells is very comprehensively described for *E. glandulosum*.—The treatise is concluded with some theoretical discussions on the origin of apogamic species. Author considers that between crossing, apogamy, doubling of chromosomes, absence of conjugation of chromosomes, and absence of reduction division a certain relation exists.—He believes namely that crossing under certain circumstances may release a tendency to apogamous evolution. Even if all cases of apogamy might be related to influence of crossing, we will not on this ground obtain a real explanation of the causes of apogamy. The paper contains important compilation and discussion of literature.—K. V. Ossian Dahlgren.

617. HULTKRANTZ, J. VILH. Om rashygien dess förutsättningar, mål och medel. Skrifter utgifna av Svenska Sällskapet för Rashygien. I. [On eugenics, its qualifications, purposes and means. Publications edited by the Swedish Eugenical Association. I.] 21.5 × 14.5 cm., 54 p.

7. fig. Upsala. 1919.—In the first part of this paper are given some facts concerning heredity in general. Pedigrees of a Swedish family with polydactyly, and the "Lister" family with progressive myoclonous epilepsy are demonstrated.—In the last part author gives an account of racial qualities of the Swedish people. By examination of men in the military service he has found that the length of body is still increasing. In the year 1887 the length was in average 169 centimeters and in 1914 it was 172 cm., which means an increase of a good millimetre per annum. Mortality of children is less and average duration of life is greater than in the other countries of Europe. Author points out the difference between influence of circumstances and hereditary constitution.—The principles of practical eugenics, different kinds of contra-selection, the problem concerning increase of population from race-biological point of view, also negative and positive eugenics, are all treated in a competent and interesting manner.—K. V. Ossian Dahlgren.

618. IBSEN, HEMAN L. Linkage in rats. Amer. Nat. 54: 61-67. Jan.-Feb., 1920.—Presents evidence indicating that three pairs of alternative characters in rats, viz., agouti vs. black, self vs. hooded, and black-eyed vs. red-eyed, are inherited independently of each other. In crosses involving red-eye and the pair color vs. albinism, there were no crossovers among seventy gametes, agreeing well with Castle's result of one apparent crossover among 434 gametes.—Sewall Wright.

619. JANSKY AND MYSLIVEČEK. Beitrag zur familiären amaurotischen Idiotie. [Contribution to familial amaurotic idiocy.] Arch. Psychol. 59: 1918.

620. JONES, D. F. Hybrid vigor and its meaning. Sci. Amer. 121: 230-231, 239-241. 7 fig. 1919.—At the Connecticut Agricultural Experiment Station maize has been artificially self-sterilized for thirteen consecutive years. The outstanding results have been a decided drop in productiveness of grain, a decrease in size and a lessened ability to withstand unfavorable conditions. At first, many undesirable kinds of plants were observed; but plants incapable of reproduction ceased their appearance after about 6 generations of self-fertilization, and the remaining inbred plants reached a point beyond which there was no further reduction in size and vigor or alteration in structure. In the process of inbreeding a large number of decidedly unfavorable characters are eliminated, but productiveness and general vigor are also lost. Crossing restores immediately what is lacking in this respect. If the hybrid individuals are self bred or bred among themselves, a rapid reduction in growth takes place which if persisted in will take the plants back to the level of the inbred parents which were used to make the cross. Hybrid vigor, therefore, is transitory in its effect and for the most part incapable of fixation; it results from a temporary securing of all or many of the good qualities from two diverse parents, since character factors, according to Bateson and Morgan, are carried in groups, and it is these groups of hereditary potentialities which Mendelize.—Chas. H. Otis.

621. JÖRGER, J. Die Familie Markus. [The Markus family.] Zeitschr. Ges. Neur. u. Psychol. 43: 76. 1918.

622. KAJANUS, BIRGER. Kreuzungsstudien an Winterweizen. [Studies on crossing winter wheat.] Bot. Notiser 1918: 235-244. 1918.—Preliminary paper on genetic studies in 22 wheat crosses of pure lines from 17 different types. These types represent *dicoccum*, *spelta*, *turgidum*, and *vulgare*. Studies have been made through from 2 to 5 generations, and have included length of internode, awns, pubescence, color of glumes, number and color of kernels, inner condition of straw, and color of leaf auricles. The segregation of these characters in the various crosses is briefly described. Crossings between *vulgare* and *dicoccum* gave in the F_2 loose forms as in spelt. This spelt form reached constancy in the F_3 , and when crossed with *vulgare* showed dominance of the spelt characters. Crossings between *vulgare* and *turgidum* gave in F_2 close spelt-like forms, and in some cases spikelets with more than one kernel as in *vulgare* and *turgidum*; one such constant form was crossed with *vulgare* and showed recessiveness of the spelt characters. In all crossings with *dicoccum*, *spelta*, and *turgidum*, squarehead

forms appeared as *vulgare* novelties. In certain crosses between *vulgare* types, forms more or less speltlike appeared. In this way speltlike forms with awns arose from parents without awns. Through a cross between smooth yellow *vulgare* and spelt, it was proven that hairiness and the gray-brown color of spelt depended on a single determiner, while in the case of the *vulgare* forms the results were different. In the forms heterozygotic in reference to the group types, the hairiness and the color were in each instance produced in accordance with the spike type. In the segregation the characters associated together maintained the same ratio. The ratio 3 hairy gray-brown to 1 smooth yellow appeared in these spelt-*vulgare* crosses. The other crosses are reported in a somewhat similar manner.—Author maintains that his observations justify the later classification of the 7 groups of wheat into two groups; viz., an Emmer series including *dicoccum*, *durum*, *polonicum*, and *turgidum*, and a Dinkel series including *spelta*, *vulgare*, and *compactum*.—W. E. Bryan.

623. KALT, B. Die Hintertuxergerste. Ein Anbau- und Züchtungsversuch. [The Hintertux barley. An experiment in culture and breeding.] Kühn-Archiv 7: 217-240. 1918.

624. KALT, B., AND A. SCHULZ. Über Rückschlagsindividuen mit Spelzweizeneigenschaften bei Nacktweizen der Emmerreihe des Weizens. [Concerning the occurrence of atavism in wheat—in the naked wheat of the Emmer type occur individuals with characters of the Spelt type.] Ber. Deutsch. Bot. Ges. 36: 669-671. 1918.—The naked wheats have probably arisen from the Spelt type and consequently one might expect the occasional appearance of individuals with the Spelt characters. That this is actually the case is shown in the new Elephant variety—a *Triticum turgidum* type—where individuals appear which exhibit the brittleness of head-axis, a typical character of the Emmer wheat.—Ernst Artschwager.

625. KAMMERER, PAUL. Vererbung erzwungener Formveränderungen. 1. Die Brunntschwiele des Alytes-Männchen aus "Wassereiern." [Inheritance of induced changes of form. 1. The callosities of the Alytes males from "water-eggs."] Arch. Entwicklungsmech. Org. 45: 323-370. Pl. 10-11. 1919.—*Alytes obstetricans* was forced to lay its eggs in water by raising the temperature at the breeding time to between 25° to 30°C. At first, most of the eggs died; but in later generations more and more of the young survived. After six generations, disease carried off the progeny. The numbers were small. In the third generation distinct rough pigmented callosities were first noted on the manus of males during the breeding season. In following generations specimens were obtained with more distinct callosities, even extending to the forearm. Some which were tested kept this character for several generations without being subjected to heat at the breeding period. Only a trace of these transitory callosities was found in the wild male *Alytes*. Some of the females of the "water-egg" line even showed as much in the breeding season as did these wild males. Animals which had shown the callosities did not lose them after castration.—John Belling.

626. KEILIN, D., AND G. H. F. NUTTALL. Hermaphroditism and other abnormalities in *Pediculus humanus*. Parasitology 2: 279-328. Pl. 12-17, 28 fig. Oct., 1919.—About one hundred and fifty hermaphroditic lice from wild and laboratory cultures were examined in detail and yielded a complete series of forms ranging from the male type to the female type, the co-existing characters of both sexes being present to a varying degree. The development of the gonads were not necessarily accompanied by the appropriate secondary sexual organs. The anatomical structure of the hermaphrodites indicated that they may have been either sexually non-functional or functional. Wild races contained from 0.2 to 8 per cent of hermaphrodites while crosses between *P. capitis* and *P. corporis* yielded in some experiments over 20 per cent. In the crossing experiments a great diminution in the proportion of females to males was observed.—D. D. Whitney.

627. KIHARA, HITOSHI. Über cytologische Studien bei einigen Getreidearten. [Cytological studies of some cereal crosses.] Bot. Mag. Tōkyō 33: 21-38. 21 text fig. 1919.—Root tips, anthers, and ovaries were treated for 1-2 minutes in Carnoy's solution with chloroform and then in Flemming's solution for 24 hours. The hybrids were produced by crossings

Triticum durum, *T. turgidum*, and *T. polonicum*, female plants with 14-28 chromosomes with *T. vulgare*, *T. compactum*, and *T. spelta*, with 21-42 chromosomes, F_1 root tips gave uniformly 35 chromosomes. The prophase is apparently of the usual type, bivalent chromosomes probably arising by the formation of post-synaptic loops. Heterotypic metaphase shows 14 bivalent and 7 univalent chromosomes. The 14 pairs separate and the 7 singles split longitudinally, giving 21 at each pole. In the second division the 14 undergo the usual equational split but the 7 are distributed somewhat tardily to one pole or the other or occasionally one or more left out of the daughter nuclei. Pollen nuclei thus contain $14 + x$ ($x = 0$ to 7) chromosomes with 17 or 18 most usual. Excluded chromosomes form chromatin nucleoli, which degenerate before maturity of the pollen. Of 5 F_2 plants 4 showed 38 and one 35 chromosomes in somatic mitoses. One F_4 plant showed a single preparation with five figures, each showing clearly 41 chromosomes. Somatic counts in a wheat-rye hybrid of the fifth generation (back-crossed to the wheat) gave counts of 42 like the F_1 in some cases but of only 38 in other plants grown from seed from the same ear as the first. The author promises to attempt to discover the relation of these cytological facts to the breeding behavior of these most interesting hybrids.—*Leonas L. Burlingame*.

628. KIHARA, HITOSHI. Ueber cytologische Studien bei Getreidearten. Mitteilung II. Chromosomenzahlen und Verwandtschaftsverhältnisse unter Avena-arten. [Cytological studies in the cereals. II. Chromosome counts in reference to the relationship of oat species.] Bot. Mag. Tokyo 33: 94-97. 2 fig. 1919.—See Bot. Absts. 3, Entry 1939.

629. KILLER, J. Über die Umzüchtung reiner Linien von Winterweizen in Sommerweizen. [Concerning the changing over of pure lines of winter wheat into spring wheat.] Jour. Landw. 67: 59-62. 1919.—See Bot. Absts. 4, Entry 87.

630. KING, HELEN D. Studies on inbreeding. IV. A further study of the effects of inbreeding on the growth and variability in the body weight of the albino rat. Jour. Exp. Zool. 29: 71-111. 8 fig. Aug. 20, 1919.—Presents data on the growth curves and variability of two strains of albino rats in the 16th to 25th generation of brother-sister mating, together with similar data for a control stock. All stocks showed a reduction from previous years in rate of growth and maximum weight, due wholly, it is believed, to unfavorable environmental conditions. The inbreds continue to be heavier than controls of the same age raised under the same conditions. There is no indication that inbreeding has caused a change in the form of the growth curve or the relative weights of the sexes. Growth curves for two independent inbred lines are nearly identical. As before, the coefficient of variation for the weight increases up to 60 days, decreases to three hundred days and then increases as some of the rats begin to fatten. Males as usual are more variable than females. Inbreds remain less variable than controls, but are more variable than earlier inbreds. Similar increase in variability of controls indicates that environmental conditions are responsible.—*Sewall Wright*.

631. KLATT, B. [Rev. of: STECHE, O. Grundriss der Zoologie. (Foundation of zoology.) 508 p. Veit. u. Co.: Leipzig. 1919.] Zeitschr. induct. Abstamm. Vererb. 22: 53-55. Dec., 1919.

632. KLATT, B. [Rev. of: STIEVE, H. Über experimentell, durch veränderte äussere Bedingungen hervorgerufene Rückbildungsvorgänge am Eierstock des Haushuhnes (*Gallus domesticus*). (On reversional processes in domestic fowl produced experimentally by changed external conditions.) Arch. Entwickl. mech. 44: 1918.] Zeitschr. induct. Abstamm. Vererb. 22: 57-58. Dec., 1919.

633. KLATT, BERTHOLD. Keimdrüsentransplantationen beim Schwammspinner. Ein experimenteller Beitrag zur Frage der Vererbbarkeit erworbener Eigenschaften. [Germ-cell transplantation in *Lymantria*. An experimental contribution to the question of inheritance of acquired characters.] Zeitschr. induct. Abstamm. Vererb. 22: 1-50. Dec., 1919.

634. KLEBAHN, [H.]. [Rev. of: DAVIS, BRADLEY MOORE. *Hybrids of Oenothera biennis and Oenothera franciscana in the first and second generation.* Genetics 1: 197-221. 1916.] Zeitschr. indukt. Abstamm. Vererb. 21: 138-140. July, 1919.

635. KLEBAHN [H.]. [Rev. of: STOMPS, THEO. J. *Über den Zusammenhang zwischen Statur und Chromosomenzahl bei den Oenotheren.* (On the correlation between stature and chromosome number in the Oenotheras.) Biol. Centralbl. 36: 129-160. 1916.] Zeitschr. indukt. Abstamm. Vererb. 21: 140-142. July, 1919.

636. KOOIMAN, H. N. *Over de beteekenis van het kruisen van individuen, behoorend tot verschillende Linné'sche soorten, voor het ontstaan onzer huisdieren.* [On the significance of crossing of individuals belonging to different Linnean species, for the origin of our domestic animals.] Ardea 7: 108-114. 1918.—The fertility of hybrids between different Linnean species is generally denied or doubted; Darwin thought hybrids between species of *Gallus* infertile, as did many fowl-breeders in later years. Experiments in crossing the Linnean species *Gallus bankiva* with *G. sonnerati* and *G. bankiva* with *G. furcatus*, made by Houwink at Meppel, have shown to the writer the occurrence of fertile hybrids between these species, the fertility being of course somewhat more limited than in "pure" individuals. But the principal result is, that the hybrids are fertile, that functioning gametes are being formed by the F_1 animals and that vital F_2 -animals may be obtained. Perhaps the results of these experiments show us the possibility of obtaining anew various races of domestic fowl by cross-breeding the wild Linnean species and thus to build their genealogical tree in a sense, not Lamarckian or Darwinian or deVriesian, that supposes all only one Linnean species as the ancestor of our domestic animals, but in a sense of crossing: two or more Linnean species may have contributed to the origin of our domestic varieties.—M. J. Sirks.

637. KRAUSE, K. [Rev. of: RAUNKIAER, C. *Über den Begriff der Elementarart im Lichte der modernen Erbllichkeitsforschung.* (On the concept of elementary species in the light of modern genetical investigations.) Zeitschr. indukt. Abstamm. Vererb. 19: 225-240. 2 fig. 1918. (See Bot. Absts. 2, Entry 41).] Bot. Jahrb. 55: 68. 1919.

638. KRÜGER. [Rev. of: COCKAYNE, E. A. "Gynandromorphism" and kindred problems. Jour. Genetics 5: 75-131. Pl. 21-24. 1915.] Zeitschr. indukt. Abstamm. Vererb. 22: 55-57. Dec., 1919.

639. KUIPER, [K.]. [Rev. of: SCHMIDT, JOHS *Racial studies in fishes. I. Statistical investigations with Zoarces viviparus L.* Jour. Genetics 7: 105-118. 1918.] Genetica 1: 557-558. Nov., 1918.

640. KUTTNER, O. [German rev. of: EKMAN, SVEN. *Studien über die marinen Relikte der nordeuropäischen Binnengewässer. II. Die Variation der Kopfform bei Limnocalanus grimaldii (de Guerne) und L. macrurus (G. O. Sars).* (Studies on the marine relicts of north European inland waters. II. The variation of the headform in Limnocalanus grimaldii (de Guerne) and L. macrurus (G. O. Sars). Intern. Rev. d. ges. Hydrobiol. u. Hydrographie 6: 1913.] Zeitschr. indukt. Abstamm. Vererb. 21: 181-182. Sept., 1919.

641. KUTTNER, O. [German rev. of: HARTMANN, OTTO. *Über das Verhältnis von Zellkern und Zellplasma bei Ceratium und seine Bedeutung für Variation und Periodizität.* (On the relation between nucleus and cytoplasm in Ceratium and its significance for variation and periodicity.) Arch. Zellforsch. 14: 1916.] Zeitschr. indukt. Abstamm. Vererb. 21: 182-183. Sept., 1919.

642. KUTTNER, O. [German rev. of: HEUSCHER, H. *Das Zooplankton des Zürichsees mit besonderer Berücksichtigung der Variabilität einiger Planktoncladoceren.* (The zooplankton of Zurich lake with special reference to the variability of some plankton Cladocera.) Arch. Hydrobiol. Planktonkunde 11: 1916.] Zeitschr. indukt. Abstamm. Vererb. 21: 180-181. Sept., 1919.

643. KUWADA, Y. Die Chromosomenzahl von *Zea Mays* L. Ein Beitrag zur Hypothese der Individualität der Chromosomen und zur Frage über die Herkunft von *Zea Mays* L. [The chromosome-number of *Zea mays* L. A contribution to the hypothesis of the individuality of chromosomes and to the problem of the origin of *Zea mays* L.] Jour. Coll. Sci. Imperial Univ. Tôkyô 39: 1-148. 2 pl., 4 fig. Aug., 1919.—Haploid chromosome-number, in starchy maize as "Black Starch," "Amber Rice Pop Corn," "Black Mexican," is 10, and fluctuates rarely into 7, 8, 9, while that in sugar-maize, or "Sugar Corn," is 12, and fluctuates very often into 9, 10, 11, 13, or 14; the diploid number which was studied in the root-tips, is generally 20. In some races of sugar-maize author finds that the chromosome-number in the root-tips is variable in different individuals of one and the same race, for it is sometimes 20, 21, 22, sometimes 23, 24; in such cases the haploid number is correspondingly variable and is 10, 11 or 12. On the basis of comparative studies on the number and length of pairs and the length of chromosomes in the root-tip author comes to the conclusion that the number of chromosomes in a nucleus may increase by the transverse division of some of them, thus, for example, 24 chromosomes are equal to 20 entire ones + 4 fractional, which were produced by transverse division of each of the remaining chromosomes into two. Further, author has found that *Euchlaena* has 10 (haploid) and 20 (diploid) chromosomes which are long, and also that *Andropogon* has the same number of chromosomes which are distinguished by their shortness; in the nuclei of maize there are found two types of chromosomes, long and short, so that chromosomes which are apparently homologous may be of different lengths and even one and the same pair is sometimes composed of two chromosomes of different lengths. From all these facts author thinks as does Collins that *Zea Mays* was originally derived from the hybridization between *Euchlaena* and some unknown species of the tribe Andropogoneae, long chromosomes belonging to the former and short ones to the latter, and that the nuclei of its various individuals possess both kinds of chromosomes in various combinations according to the law of chance. As both *Euchlaena* and *Andropogon* have 10 chromosomes as haploid number, their original number in *Zea Mays* will be 10, 12, etc., being derived from 10. The chromosomes derived from *Euchlaena* (long) have the tendency to undergo the transverse division, so that in synapsis each such chromosome either presents itself as two fractional ones or remains single and retains that tendency, while those derived from *Andropogoneae* (short) have no such tendency at all and remain always single. When in synapsis the two fractional chromosomes of *Euchlaena* origin derived from one chromosome by transverse division on one side and a single one of the same origin retaining the tendency of dividing on the other happen to form together a geminus, the single one is generally compelled to divide transversely into two by the influence of the fractional companions, so that in such case the two fractional chromosomes may be said to be "dominant" to the single one, though sometimes exceptions may occur; the number of chromosomes is therefore variable in different cases. When, on the contrary, the two fractional chromosomes come to form a geminus together with a single one originating from *Andropogoneae* having no tendency to divide, the former are always compelled to fuse to each other, end to end, owing to the influence of the latter, so that in all such cases the former may be said to be "recessive" to the latter; the chromosome-number is always constant in such cases. The variability of the chromosome-number, haploid as well as diploid, in various individuals, even in one and the same race, may be easily comprehensible, because there will be according to individuals different modes of combinations of different gemini as the consequence of fertilization, which are considered in detail by author. Author also discusses various cytological and genetical subjects.—S. Ikeno.

644. KÜSTER, ERNST. Über weissrandige Blätter und andere Formen der Buntblättrigkeit. [On white-margined leaves and other forms of variegation.] Biol. Zentralbl. 39: 212-251. 27 fig. May, 1919.—Variegated leaves and shoots having green and colorless areas more or less sharply delimited are divided into three groups: marginal, sectorial, and mottled or pulverulent variegation. Consideration is given primarily to marginal variegation which is divided into four types: (1) *Pelargonium zonale* type, with green leaves having a white border of varying width around the entire leaf. (2) *Saxifraga sarmentosa* type, green leaves with a white margin but on the margin is a sprinkling of small green areas. (3) *Spiraea bumalda* type,

shoots which produce intermittently green and variegated leaves. The variegated leaves are pale green with white margins and have relatively large green sectors. (4) *Sambucus nigra* type, white margined leaves that have a deep green central field and a pale green zone of varying width between the central field and margin. The author states that pure albino shoots do not exist. Sooner or later such shoots produce leaves which have very small areas of green, especially beneath the lower epidermis. Variegated leaves that have the arrangement of the colored and colorless areas in the above types inversed are referred to as inverse variegation. Author points out that Baur's explanation cannot account for isolated green areas in the margin of leaves having the *Saxifraga sarmentosa* type of variegation, and that it cannot at all explain the *Spiraea bumalda* type. He suggests that the phenomena of variegation can be most simply explained by assuming reversible somatic mutations, somewhat analogous to Beyerinck's variegated race of bacteria, *Chlorella variegata*. It was observed (1) that the frequency of mutation and subsequent development of variegation differs in the various families and genera of plants, (2) that the frequency of mutation of cells at the growing point differs at different stages of the shoot's growth, (3) that cells in different parts of the same leaf blade do not mutate with the same frequency, and (4) that when variegated shoots are cut back variegation is much more pronounced in the regenerated shoots.—W. H. Eyster.

645. LAUGHLIN, H. H. The relation between the number of chromosomes of a species and the rate of elimination of mongrel blood by the pure-sire method. Proc. Soc. Biol. and Med. 16: 132-134. 1919.—The degree of elimination of mongrel "blood" by the pure-sire method depends upon (a) the number of chromosomes characteristic of the species, (b) the proportion of mixed dams of each possible pure chromosome-number used in each generation, (c) the relative fecundity of dams of different pure chromosome-number, and (d) the number of generations through which the system is carried. The probabilities of mongrel blood being entirely eliminated in any given individual in generations one to ten in such a system, with the calculations based on certain assumptions, are stated.—C. B. Hutchison.

646. LEBIUS, FRANZ. Familienforschung. [Genealogical investigation.] 34 p. H. A. L. Degener: Leipzig. 1918.

647. LEHMANN, ERNST. Die Pentasepalie in der Gattung Veronica und die Vererbungsweise der Pentasepalen Zwischenrassen. [Pentasepaly in the genus Veronica, and the manner of inheritance of the eversporting varieties of the penta-sepalous forms.] Ber. Deutsch. Bot. Ges. 36: 28-46. Fig. 2. 1919.—In crossing the penta- and tetra-sepalous *Veronica Corrensiana* with the penta-sepalous *V. tubingensis* we get in the F_1 generation between 71 and 98 per cent penta-sepalous flowers. If we cross the tetra-sepalous *V. Aschersoniana* with the penta-sepalous *V. tubingensis* we get in the F_1 generation between 3 and 23 per cent penta-sepalous flowers, that is, a dominance of the tetra-sepalous form, pentasepaly in the first case being dominant, in the second case recessive. In the F_2 generation we get a large percentage of tetra-sepalous flowers. By crossing them, a nearly pure pentasepalous form with a nearly pure tetra-sepalous one, we get intermediate races—*eversporting varieties*—the condition becoming more complex because of the change in dominance. In the Scrophulariaceae, there are many members which show inhibition in the development on the dorsal side of the flower primordium with a corresponding increase in growth on the proximal side. This inhibition in growth may lead to a complete reduction of the distal median calyx lobe. In the genus *Veronica*, this latter condition is nearly reached. Some forms show only a slight reduction and in that case we do not get change from penta- to tetra-sepaly upon crossing; that is, intermediate races do not appear. Other forms, such as *V. tubingensis* and some *Teutricum* races, are intermediate. Another extreme is found in *V. Corrensiana* and *V. Aschersoniana*, where penta-sepaly occurs only occasionally. Both extremes of phylogenetic development may be connected by crossing; but the condition becomes complex because of the appearance of intermediate races with a fluctuation in dominance of penta-sepaly and tetra-sepaly.—Ernst Artschwager.

648. LITTLE, C. C. **Colour inheritance in cats, with special reference to the colours black, yellow and tortoise-shell.** Jour. Genetics 8: 279-290. Sept., 1919.—Author attempts to explain nature of sterile and fertile tortoise-shell males and anomalous occurrence of blacks. Hypotheses of ISEN, WRIGHT, DONCASTER, and WHITING are reviewed and criticized. Mutation of yellow to black in parents accounts for anomalous black offspring. Tortoise-shell males may result from non-disjunction, the sterile being "near males."—*P. W. Whiting.*

649. LITTLE, C. C. **Human sex-ratio.** Proc. Soc. Exp. Biol. and Med. 16: 127-130. 1919.—From the records of the Sloane Lying-In Hospital, New York City, of 7058 births, 5753 of them progeny of pure racial matings of eight different European races, and 1305 progeny of hybrid matings among these same races, author determined sex ratios and found a higher percentage of males to females in hybrids than in pure stocks, 121.56 ± 2.06 for hybrids, and 106.27 ± 0.91 for pure stock. This is same result as that obtained by PEARL in 1908 using data of Buenos Ayres including 219,516 births, though each ratio is higher than the corresponding one in the South American data which gave a ratio of 105.99 ± 0.39 for hybrids and 102.21 ± 0.16 for pure stock. Since Pearl's data did not take still-births into consideration and it was not known what effect that might have on the result, Little tabulated still-births separately, but found that their sex ratios are not significantly different from those obtained for live-births or for all births together. He found also a lower percentage of still-births in the hybrids than in the pure stock, 3.98 ± 0.36 in hybrids and 6.17 ± 0.21 in pure stock, indicating that hybrids in man tend to show the vigor characteristic of hybrids in other animals.—*Sylvia L. Parker.*

650. LITTLE, C. C., AND E. E. JONES. **Inheritance of coat color in Great Danes.** Jour. Heredity 10: 309-320. Fig. 12. Oct., 1919.—The authors give a brief historical sketch of the breed and a description of the color varieties. A review of previous literature follows in which the behavior of color factors of other breeds is compared to instances occurring in Great Danes. Assuming that Great Danes are a mixed population, characteristic ratios are given for random matings using dilute and intense pigmentation. Observed experimental results are based upon data derived from the American Kennel Club Stud Books, Volumes 11 to 34 inclusive. A detailed analysis of the inheritance of various color factors leads to the following conclusions: (a) There is a single Mendelizing factorial difference between intense pigmented varieties and the dilute varieties. The factor for intensity being epistatic to its allelomorph. (b) The three coat conditions, black, brindle, and fawn are dependent upon three mutually allelomorphous factors: E for full extension of black pigment, E' for partial extension (the brindle pattern), and e' for its restriction to the muzzle, nose, and feet. The allelomorphs being $E E$, $E E'$, or $E e'$; $E' E'$, $E' e'$; and $e' e'$: (c) Harlequin spotting (H) is epistatic to solid coat color (h); (d) The rare appearance of minute-white-spotted individuals of a progeny of solid colored animals is probably due to a factor (s) which is hypostatic to its allelomorph (S) for self coat color.—*Maxwell J. Dorsey.*

651. LOEB, LEO. **The individuality-differential and its mode of inheritance.** Amer. Nat. 54: 55-60. Jan.-Feb., 1920.—Individuality-differential is a chemical characteristic which is same for all tissues of one individual but different for different individuals. Inheritance of differential has been tested in rats and guinea-pigs by transplantations from parents to children, children to mother, and brothers to brothers. Differentials of children are intermediate between those of parents, but very variable. Probably those of F_2 are also intermediate. Author suggests that individual has two sets of differentials, one from each parent, and each set consists of two kinds of differentials. Differentials are supposed to be related to composition of chromosomes and to involve side-chains of proteins.—*A. Franklin Shull.*

652. LOTSY, J. P. **Mutatie of kruising, de oorzaak der evolutie? (Mutation from crossing the cause of evolution?)** Nederl. Tydschr. Geneeskunde 172: 1395-1404. 1918.—In organic matter form is always the result of a process of crystallization; per analogon to this in organic beings also the form building results from a perpetual arrangement of the composing parts according to their form. This analogon is allowed and defended with fol-

lowing arguments: (1) The plasma may increase, though only dead material is given to it as nurture, while pangens are supposed to be "living" things.—(2) If this is not yet the case, then the organism analyses all food material into simple groups of molecules and abolishes all traces of organised structure.—On these grounds the writer denies the existence of living "genes," "pangenes," or how these living particles may be called and accepts only molecules as building stones for the organism. To go more into details in these questions, the author thinks it thoroughly useless, because of our ignorance about the simplest processes of formbuilding in living material. For instance the problem of the real nature of the zygote in animals. This zygote is generally accepted to be a double-cell, resulting from equivalent parts, one from the father, one from the mother. But these parts are really not equivalent. First, the zygotic plasm is only supplied by the mother; the zygote therefore is not a double-cell, but a simple cell with a double-nucleus. According to the conceptions of Schaxel, the zygotes have only one kind of plasma and two kinds of nuclei; along these lines the difference of reciprocal crosses as observed in some cases, may perhaps be explained.—Even if by experimental researches the alternative "mutation or crossing, cause of evolution" were decided in one or the other direction, then our explanation of the evolutionary process would only have begun. The significance of nucleus and plasm and their interrelation will remain a further problem to be solved. Perhaps the study of *Oenotheras* (nucleus-chimaeras as the author calls them) will bring us still many new facts in this direction.—*M. J. Sirks.*

653. LOTSY, J. P. [Dutch rev. of: ANONYMOUS. Wanted, photographs of twins. Jour. Heredity 9: 262. Oct., 1918. (See Bot. Absts. 2, Entry 232.)] *Genetica* 2: 89-90. Dec., 1920.

654. LOTSY, J. P. [Dutch rev. of: DeVRIES, HUGO. Twin hybrids of *Oenothera Hookeri* T. and G. *Genetics* 3: 397-421. Sept., 1918. (See Bot. Absts. 3, Entry 2111.)] *Genetica* 2: 88-89. Jan., 1920.

655. LOTSY, J. P. [Dutch rev. of: DUERDEN, J. E. Absence of xenia in ostrich eggs. Jour. Heredity 9: 243-245. Oct., 1918. (See Bot. Absts. 1, Entry 1479.)] *Genetica* 2: 54. Jan., 1920.

656. LOTSY, J. P. [Dutch rev. of: EMBODY, G. C. Artificial hybrids between pike and pickerel. Jour. Heredity 9: 253-256. Fig. 4-5. Oct., 1918. (See Bot. Absts. 2, Entry 25.)] *Genetica* 2: 59-60. Jan., 1920.

657. LOTSY, J. P. [Dutch rev. of: NESS, H. Hybrids of the live oak. Jour. Heredity 9: 263-268. Fig. 6-8. Oct., 1918.] *Genetica* 2: 77-78. Jan., 1920.—See Bot. Absts. 1, Entry 1275.

658. LOTSY, J. P. [Dutch rev. of: PEARL, RAYMOND. Some commonly neglected factors underlying the stock breeding industry. Ann. Rept. Maine Agric. Exp. Sta. 1917: 1-28. 1917.] *Genetica* 2: 79. Jan., 1920.

659. LOTSY, J. P. [Dutch rev. of: PEARL, RAYMOND. The experimental modification of germ cells. I. General plan of experiments with ethyl alcohol and certain related substances. Jour. Exp. Zool. 22: 127-164. Jan., 1917.—*Ibid.* II. The effect upon the domestic fowl of the daily inhalation of ethyl alcohol and certain related substances. *Ibid.* 165-186. Jan., 1917.—*Ibid.* III. The effect of parental alcoholism, and certain other drug intoxications upon the progeny. *Ibid.* 241-310. Feb., 1917.] *Genetica* 2: 79-80. Jan., 1920.

660. LOTSY, J. P. [Dutch rev. of: PEARL, RAYMOND. On the differential effect of certain calcium salts upon the rates of growth of the two sexes of the domestic fowl. *Science* 44: 687-688. No. 10, 1916.] *Genetica* 2: 78. Jan., 1920.

661. LOTSY, J. P. [Dutch rev. of: POPENOE, P. Will morality disappear? Jour. Heredity 9: 269-270. Oct., 1918. (See Bot. Absts. 2, Entry 259.)] *Genetica* 2: 81. Jan., 1920.

662. LOTSY, J. P. [Dutch rev. of: SHAMEL, A. D. Why navel oranges are seedless. Jour. Heredity 9: 247-249. 2 fig. 1918.] Genetica 2: 83-84. Jan., 1920.

663. LOTSY, J. P. [Dutch rev. of: TIEBBES, K. Sur les Rapports génétiques entre *Thaumalea picta* et *Thaumalea obscura* Schlegel. (On the genetical agreement between *Thaumalea picta* and *Thaumalea obscura* Schlegel.) Arch. Néerland. Sci. 3: 316-323. 1917.] Genetica 2: 87-88. Jan., 1920.

664. LOTSY, J. P. De Oenotheren als kernchimeren. [The Oenotheras as nuclear chimeras.] Genetica 1: 7-69. 1919.

665. LOTSY, J. P. Cucurbita-Strijdvragen. De soortquaestie. Het gedrag na kruising. Parthenogenese? [Controversial questions concerning Cucurbita. The species question. The behavior after crossing. Parthenogenesis?] Genetica 1: 497-531. Nov., 1919.

666. LÖHLEIN, M. Die Begriffe "Konstitution" und "Disposition." [The concepts "constitution" and "disposition."] Mediz. Klinik. 1918.

667. LUND, DAVID. Über die Ursachen der Jugendasozialität. Kriminalpsychologische und soziale Untersuchungen mit Einschluss von Familienforschungen in Schweden. [On the causes of youthful delinquency. Criminal-psychological and social investigations with inclusion of family-studies in Sweden.] 16 × 25 cm., iv + 358 p., 21 fig., 1 general table. Inaugural-Dissertation. Upsala, 1918.—Author has made it his principal object to study the causal importance of heredity and environment as influencing the criminality of youth. His principal material consisted of boys sentenced to forced education at a Swedish establishment Hall. Anthropometrical measurements show the delinquent youths often to be of very mixed race. For instance 33.7 per cent are brachycephalous and 9.7 per cent brown-eyed, whereas the numbers for the whole population of Sweden are 13.0 and 4.5 per cent respectively. A minute account is given of the ascendance, surroundings, physical and psychical state of a great many individuals. It appears from these family inquiries that the delinquency must be to very great measure hereditarily founded, although the surroundings may of course also play a great part. The number of imbecile and psychopathic individuals is many times larger among boys grouped on basis of heredity, than among those whose delinquency is attributable to environment. The comprehensive memoir finished with a chapter on future policy of treatment of criminality with reference especially to that of youth. The author lays stress among other things on the necessity of prophylactic measures against the propagation of hereditarily burdened individuals. The investigation shows that the number of children is smaller in the families where anomalies of one kind or another are comparatively rare, than in those where the frequency of inferiorities is greater.—K. V. Ossian Dahlgren.

668. LUNDBORG, H. Rasbiologiens ställning som medicinskt vetenskapligt fack och dess betydelse för kulturen i allmänhet. [The place of racial biology as a discipline of scientific medicine and its importance for culture in general.] Hygienisk Revy Lund 1918: 48-50. April 15, 1918.—Author insists upon the founding in Sweden of a state institute of racial biology.—K. V. Ossian Dahlgren.

669. MACFARLANE, J. M. The causes and course of evolution. 875 p. Macmillan Co.: New York, 1918.

670. MACKIE, D. B. Notes on a navel variety of the Satsuma orange. California Citrograph 4: 20-21. Nov., 1918.—Writer repeatedly observed navel marking on Satsuma fruits in Japan, and obtained a summary of a Japanese paper by A. KIKUCHI, entitled The appearance of the navel mark on the Satsuma orange.—According to Kikuchi the navel mark is small, affects only the rind, and appears on only part of the fruits on a tree. A statistical study of fruits indicates that navel fruits are larger, heavier, and more oblate than normal fruits from the same tree. [See Bot. Absts. 2, Entry 55.]—H. B. Frost.

671. MALTHOUSE, G. T. Seedling potatoes. *Gard. Chron.* 66:291. Dec. 6, 1919.—Refers to previous article by Fred J. Chittenden, and gives further examples of seedling potatoes that were apparently identical to previously introduced varieties.—*Fred A. Krantz.*

672. MANDEKIC, V. Prilog gojidbi Kukuruza. [Contributions to the breeding of maize.] *Gospodarska smotra* 1918:1-4. 1918.

673. MANDEKIC, V. Nesljektivonje niki divjstore Koet Kulkuruza. [Inheritance of several characters in maize.] *Gospodarska smotra* 1918:5-8. 1918.

674. MATHIEU, E. Acclimatisation trials of lima beans (*Phaseolus lunatus*). *Gardens' Bull. Straits Settlements* 2:121-129. 1919.—See *Bot. Absts.* 4, Entry 97.

675. MAYER-GMELIN, H. Mededeelingen omtrent enkele kruisings en veredelingsproefnemingen. [Reports on several experiments in crossing and selection.] *Cultura* 30:1-19. 4 pl. 1918.—The paper gives three reports about experiments in crossing and selection: 1. Natural hybridizations in beans; 2. Natural hybridizations in wheat and spelt; 3. Selection in rye and the difference in result of selfing between different plants of rye.

1. In a previous paper the writer published some researches about crossbreeding of beans; his experiments in 1916 and 1917 were made in this manner, that two plants of different races were isolated together in one cage, humble-bees were brought therein to obtain if possible hybrids between these plants. The experiments failed; while in the posterity of the freely flowering plants spontaneous hybrids were observed, sometimes in 2 per cent the plants isolated in cages did not yield any hybrid. The cause of this failure is still unknown.

2. Spontaneous hybridization in wheat results not only, if different races of wheat are grown in the vicinity of each other, but also if wheat is grown near spelt. The difference of sensibility for crossing, already observed by Nilsson-Ehle, was also remarkable in the writers cultures; his experiments gave besides spontaneous crossings between wheat varieties also between wheat and spelt. The maximum of such crossings between races of wheat was found to be 0.87 per cent, between wheat and spelt 0.43 per cent. Self fertilization is far the most important in wheat, but crossing sometimes happens especially in the earlier races.

3. Selection in rye has shown that between different plants of rye a great difference exists regarding sensibility for selfing. Some isolated plants have only empty ears, others contained a more or less important number of grains. By selection along these lines breeding of selfing races of rye will be possible.—*M. J. Sirks.*

676. M[AYOR], A. G. [Rev. of: CRAMPTON, HENRY EDWARD. *Studies on the variation, distribution, and evolution of the genus Partula. The species inhabiting Tahiti.* Carnegie Inst. Washington Publ. 228. 313 p., 34 pl., 7 fig. Jan., 1917.] *Science* 51:142-143. Feb. 6, 1920.

677. MEUNISSIER, A. Expériences génétiques faites à Verrières. [Genetical experiments made at Verrières.] *Bull. Soc. Nation. Acclimat. France* 1918:1-31. 1918.—Résumé of the genetic work at Verrières-le-Buisson under the direction of Philippe de Vilmorin from 1902 to 1914. References to other genetic work are intermingled.—In *Pisum*, the parchment of the pod, the form of the pod, the bloom on the plant, adherence of the seeds, absence of tendrils, number of flowers on the peduncle, and the colored eye of the seed, have been especially studied. A commercial pea without tendrils has been raised.—In *Triticum*, the color and branching of the ear, supernumerary spikelets, and height of plant, have been attended to. A dominant dwarf, existing only as a heterozygote; and a distinct maternal influence on the height of the F₁ generation, have been found. New wheats have been raised for the Balkans, Algeria, Argentina, and Chile. In the last three cases, the best varieties of the country were crossed with high-yielding European kinds.—With *Avena* a secular experiment has been started, by growing the same 4 constant strains in England, Sweden, Germany, Holland and France.—In *Hordeum*, a recessive strain with smooth awns is considered useful in some cases.—Species crosses were studied in several genera. In *Argemone*, double flowers and

plants with some stamens transformed into carpels resulted. Species crosses of *Digitalis*, and of *Gladiolus*, were also noteworthy.—In dogs, (*Canis*), tailless and short-tailed strains were crossed with normals, and all the abnormals were found to be heterozygous. Length of paws, and blackness of tongue, were also considered.—A bibliography of the work at Verrières is added.—*John Belling*.

678. MICHAEL, ELLIS L. Concerning application of the probable error in cases of extremely asymmetrical frequency curves. *Science* 51: 89-91. Jan. 23, 1920.—This paper suggests that in cases of extremely asymmetrical frequency curves, the proper method of treatment is to find some function of the measurements whose frequency distribution is Gaussian, and apply the probable-error calculation to that function. In the illustration used (successive bacterial counts from muscle emulsion made from five muscles of pollution area) the scale used is changed from the frequency of the actual counts to the frequency of the logarithms of the actual counts. This change makes the asymmetrical frequency Gaussian. The calculations are made on this frequency and the results when complete converted back to the actual figures of the experiment.—*John W. Gowen*.

679. MILLER, EDWIN C. Development of the pistillate spikelets and fertilization in *Zea mays* L. *Jour. Agric. Res.* 18: 255-266. *Pl.* 19-32. Dec. 1, 1919.—Fertilization occurs 26 to 28 hours after pollination. Although many pollen tubes started down a style at one time only one reached the ovary cavity in 100 observations.—*D. F. Jones*.

680. MILLIKEN, C. S. Handling of select citrus buds. *California Citrograph* 3: 73. 1 diagram. Feb., 1918.—Describes work of Fruit Growers' Supply Company in furnishing bud wood from trees of known high productiveness.—*Howard B. Frost*.

681. MILLIKEN, C. S. Importance of having best type of citrus trees. *California Citrograph* 3: 277. Sept., 1918.—Popular, brief.

682. MILLIKEN, C. S. Importance of using reliable citrus trees in new plantings. *California Citrograph* 4: 158, 171. Apr., 1919.—Popular.

683. MIYOSHI, MANABU. Über der Erhaltung einer neuen wildwachsenden hängenden Varietät des Kastanienbaumes als Naturdenkmal. [Concerning a new wild chestnut with weeping branches and its preservation as a natural monument.] *Bot. Mag. Tôkyô* 33: 185-188. 1 photo. Sept., 1919.—See *Bot. Absts.* 4, Entry 452.

684. MOELI, C. Über Vererbung psychischer Anomalien. [On inheritance of psychic anomalies.] *Deutsche med. Wochenschr.* 1918.

685. MOLYNEUX, E. Fasciation not inherent. *Gard. Chron.* 64: 210. 1 fig. Nov. 23, 1918.—In a number of cases wheat plants bearing a "double" (bifurcated) terminal spike shows no perpetuation of this abnormality in succeeding generations. The illustration given indicates that a fasciation is not involved.—*T. H. Goodspeed*.

686. MOTTIER, D. M. Chondriosomes and the primordia of the chloroplasts and leucoplasts. *Ann. Botany* 32: 91-114. 1 pl. Jan., 1918.—Chondriosomes and plastids morphologically unrelated. Exact function of former unknown. Both are permanent organs and concerned in hereditary transmission; "they must occur in the cytoplasm of both gametes in all plants." Even anthocyanins may be inherited through some such extra-nuclear mechanism.—*Merle C. Coulter*.

687. NAGAI, ISABURO. The correlation in the differentiation of sex in the fern prothallis. *Bot. Mag. Tokyo* 33: 157-170. *Tab. I-IV.* 1919.—See *Bot. Absts.* 4, Entry 1562.

688. NOACK, KONRAD. [German rev. of: BALLY, WALTER. Die Godronschen Bastrade zwischen Aegilops- und Triticumarten. Vererbung und zytologie. (The Godronian hybrids

between species of *Aegilops* and *Triticum*. Heredity and cytology.) Zeitschr. indukt. Abstamm. Vererb. 20: 177-240. 4 fig. Feb., 1919.] Zeitschr. Bot. 11: 538-541. 1919.

689. ONSLOW, H. The inheritance of wing colour on Lepidoptera. 1. *Abraxas grossulariata* var. *lutea* (Cockerell). Jour. Genetics 8: 209-259. Pl. 9-10, 25 fig. Sept., 1919.—Orange-yellow ground color of *lutea*, vs. white of type, is "incompletely dominant," or rather, since the mode of the narrowly fluctuating pale yellow of F_1 is nearer the color value of the almost white parent than that of the orange-yellow, "not completely recessive" is more exact. Homozygous orange-yellow likewise gives typical probability-of-error curve. Back-cross of pale heterozygote with homozygous *lutea* shows marked bimodal distribution, grouped about color values of respective parents. F_2 fluctuates more widely than F_1 , showing primary mode at color value of pale yellow parents and secondary mode in deep orange-yellow. Mendelian segregation is thus indicated. In back-cross of a rather deeply colored $F_1 \text{ } \varnothing \times \text{type (white)}$, yellow color of former "does not seem to have any effect." Simple curve, with its one mode at very pale orange-yellow, results from this back-cross. Numerical color values determined by "tintometer," which is described. In reciprocal crosses of *lutea* \times *lacticolor*, the usual tendency of femaleness in this species slightly to inhibit development of yellow is exaggerated. "In the deepest colours the yellow pigment is diffused through the chitinous walls of the scales without the formation of any granules."—J. H. Gerould.

690. ONSLOW, H. Inheritance of wing colour in Lepidoptera. II. Melanism in *Tephrosia consonaria* (var. *Nigra* Banks). Jour. Genetics 9: 53-60. 1 pl. Dec., 1919.—The geometrid *Tephrosia consonaria* var. *nigra*, which is almost uniformly black in the \varnothing , brownish-black in the σ , was crossed with the grayish, mottled type, to which it is completely dominant. Extracted recessives differ from the type only in being grayer, less ochreous, than most wild individuals.—J. H. Gerould.

691. PAIRMAN, ELEANOR, AND KARL PEARSON. On corrections for the moment coefficients of limited range frequency distributions when there are finite or infinite ordinates and any slopes at the terminals of the range. Biometrika 12: 231-258. Nov., 1919.—This paper gives additional correction formulae for correcting the moments of frequency curves where high contact is not present, in this sense therefore the paper is an extension of the correction formulae of Sheppard.—Correction formulae are presented for all moments up to the seventh for curves where the terminal frequencies are finite quantities as in the case of truncated frequency distributions and where the terminal frequencies are infinite as for J and U curves. Cases illustrative of the use of the formulae on actual frequency data are presented.—John W. Gowen.

692. PARKER, JOHN H. A preliminary study of the inheritance of rust resistance in oats. Jour. Amer. Soc. Agron. 12: 23-38. 1920.—Pedigree lines of two oat varieties, Burt and Sixty-day, together with a large number of F_2 generation hybrids between these varieties were studied in relation to their rust resistance. The rusts used were the crown rust of oats, *Puccinia lolii avenae* McAlpine and the stem rust of oats, *Puccinia graminis avenae* Erikss. and Henn. Burt and Sixty-day and all the hybrids of these varieties so far tested were found to be entirely susceptible to stem rust. All plants of Sixty-day also were uniformly susceptible to crown rust. Of 223 inoculated plants of Burt, 48 were classified as resistant, 152 as intermediate and 23 as susceptible.—F. M. Schertz.

693. PARMENTER, CHARLES L. Chromosome number and pairs in the somatic mitoses of *Ambystoma tigrinum*. Jour. Morph. 33: 169-249. 9 pl. Dec. 20, 1919.—Material was obtained from larvae of *Ambystoma* (or *Amblystoma*) *tigrinum*. Mitotic figures in epithelial cells of tail, gill plates and lung, and of the endothelium from peritoneum and mesentery, were studied. Author finds in 66 cells of 23 individuals that the chromosome number is constantly 28. Linear measurements indicate that the chromosomes of a cell form approximately a duplicate series of sizes, and there is considerable resemblance in the form of chromosomes that are members of the same pair. Approximate constancy in size relations between

pairs in complexes of different individuals is noted. In the cells studied, the chromosomes are seldom actually associated in pairs. Results support theory of individuality of chromosomes, and in particular harmonize with the view that in the somatic cells the chromosomes exist in biparental pairs.—*Bertram G. Smith.*

694. PARMENTER, CHARLES L. The chromosomes of parthenogenetic frogs. *Jour. Gen. Physiol.* 2: 205-206. Jan. 20, 1920.—Spermatogonial chromosome groups in frogs developed from artificially parthenogenetic eggs are clearly diploid, probable number 26. Tetrads of normal form are produced in haploid number. Author suggests diploid number of chromosomes is due to retention of second polar body, or to premature division of chromosomes before first cleavage of egg, but work on this point is still in progress.—*A. Franklin Skull.*

695. PAYNE, F. Selection for increased and decreased bristle number in the mutant strain 'reduced.' *Anat. Rec.* 17: 335-336. Jan. 20, 1920.—[Author's abstract of paper read before American Society of Zoologists, St. Louis, December 30, 1919.]—In the seventh generation of the strain selected for extra bristle number appeared a male with 1 bristle on the scutellum. When out-crossed to wild this reduced condition of the bristle number behaved as a sex-linked character. The number of bristles in this mutant line varied from 0 to 4. Minus and plus selection lines were started and carried for 64 and 60 generations, respectively. Toward the end of the experiment the percentage of zero flies in the minus line varied from 96 to 100. A pure line with no bristles was not produced. In the plus line the percentage of flies with 4 bristles (this is the normal number) reached 64.25 in the fifty-fifth generation. There were very few flies with one and no bristles. The two lines were widely different at the end of the experiment. They came originally from the same pair of parents. How do they differ genetically, is the question. By means of linkage it was shown that there are at least two factors and probably a third concerned in the production of bristles in the plus line. Two of these factors are sex-linked. If there is a third present, it is in the third chromosome. In the minus strain only a single factor is present.—*F. Payne.*

696. PAYNE, F., AND MARGARET DENNY. Heredity of orange eye color. *Anat. Rec.* 17: 337. Jan. 20, 1920.—[Author's abstract of paper read before American Society of Zoologists, St. Louis, December 30, 1919.]—Orange appeared in the mutant strain "reduced." When mated to wild, three kinds of males appeared in F_2 . They were red, orange, and a new one called "salmon." From this it seemed that orange was due to two factors, and that they crossed over in F_1 . One of these factors by itself produced salmon, the other produced no visible effects. We shall call this second factor "salmon modifier." Experiments were devised to test this hypothesis. If crossing-over occurs between salmon and salmon modifier in F_1 , then some of the F_2 red males should carry salmon modifier. These were tested by mating to pure-line salmon females. If crossing-over occurs in F_1 of this cross, salmon and salmon modifier should occasionally get into the same chromosome, and hence orange males should appear in F_2 . They do occur, and hence the assumption is justified.—The above outlines the behavior of orange when mated to wild. When mated to reduced, however, no crossing-over occurs in F_1 , and hence only orange and red males appear in F_2 . Presumably a non-crossover factor is present in the reduced strain which prevents crossing over between salmon and salmon modifier. This has not been sufficiently analyzed to report further.—*F. Payne and Margaret Denny.*

697. PEARL, RAYMOND, AND JOHN RICE MINER. Variation of Ayrshire cows in the quantity and fat content of their milk. *Jour. Agric. Res.* 17: 285-322. 6 fig. 1919.—A biometrical analysis of variation in quantity per unit of time, and in quality as indicated by fat percentage, of the milk of nearly 7000 Scottish Ayrshire cows for the years 1908 and 1909. In this analysis the milk or butter-fat percentage for each year of age was analyzed separately. —Mean weekly yield of milk with advancing age is found to be represented by a logarithmic function, and to be in accordance with a law which may be stated in this way: The absolute amount of milk produced per unit of time increases with the age of the cow until the maximum is reached, but the rate of increase diminishes with advancing age until the absolute

maximum of production is reached. After the time of maximum productivity, the absolute production per unit of time decreases with advancing age at a continually increasing rate.—Mean fat percentage of the milk was found to decline with advancing age until the tenth year of the cow's life is reached. From this point on, the fat percentage remains about constant through the remainder of the milking life of the cow.—Weighted mean standard deviations and coefficients of variation for mean weekly milk yield was 2.806 gallons and 17.081 per cent, respectively. When all ages were lumped together 3.329 gallons and 20.816 per cent. For fat percentage the weighted mean values for cows of any given age are: Mean = 3.738, standard deviation = 0.330 and coefficient of variation = 8.827.—Relative variability of milk production is compared with other physiological characters; among others the udder as a secreting organ is compared with the oviduct of the hen. It is shown that the oviduct considered as a mechanism operates with somewhat less variability than does the udder, having regard to the absolute weight of the product in the two cases.—Comparisons are made between the relative variability of mean weekly milk yield of these Ayrshires and the daily fluctuations in mixed milk of a large herd. (Such fluctuations are presumably due to environmental alone since individual genotype is averaged.) The coefficients of variation stood in the relation of 17.081 to 9.05 respectively. This is held to indicate that about one-half of the observed variation in milk production results from the varying genotypic individuality of the animals with respect to this character and that the other half results from varying environmental influences.—The frequency curves were fitted by the use of Pearson type curves.—Milk-production curves, analytically considered, tend definitely toward positive skewness. This is true in respect to yield and to quality. The weighted mean value of the skewness for mean weekly yield is found to be + 0.1047, and that for fat percentage + 0.1338. These curves for milk yield tend to fall more frequently in unlimited-range types, while those for fat percentage tend more to limited-range types. The estimation of range ends given by the theoretical curves are, on the whole, good.—In general the tendency of milk-yield curve is toward the leptokurtic condition—that is, they are more peaked than the corresponding normal curves would be. Fat percentage curves do not show any definite tendency with respect to kurtosis.—Certain of the milk-yield curves were dissected into two normal curves by Pearson's method. The resulting graduation was not so good as that given by the appropriate unimodal skew frequency curve. There is no evidence that variation curves for milk production are bimodal.—*John W. Gowen.*

698. PEARL, RAYMOND. Certain evolutionary aspects of human mortality rates. *Amer. Nat.* 54: 5-44. 2 fig. Jan.-Feb., 1920.—Suggests that studies of vital statistics in man from biological standpoint permit important evolutionary generalizations. Asserts that International-Classification causes of death—180 or more in 14 groups—is biologically unnatural. Presents new classifications for purposes of particular investigation, somewhat changed from International, based on particular group of organs breaking down and causing death, as follows: (1) Circulatory system, blood and blood forming organs. (2) Respiratory system. (3) Primary and secondary sex organs. (4) Kidneys and related excretory organs. (5) Skeletal and muscular systems. (6) Alimentary tract and associated organs concerned in metabolism. (7) Nervous system and sense organs. (8) Skin. (9) Endocrinal system. (10) All other causes of death.—Gives tabular statistical data from U. S. of America, England, Brazil (São Paulo), under each of ten groups in descending-magnitude mortality from three regions, per 100,000. Presents reasons for departure from International method in group classification of many diseases. Tabulates relative importance (breakdown) of organ systems in mortality with discussion. Groups rearranged in descending series on basis of data presented are as follows: (2), (6), (1), (7), (4), (3), (5), (8), (9).—Considers relative mortality on basis of germ layers with interesting result that approximately 57 per cent are endodermal, 30-35 per cent mesodermal, 8-13 per cent ectodermal and assumes inverse correlation with evolutionary degree of differentiation of the germ layers. Emphasizes importance of innate factors as contrasted with environmental factors in influencing mortality.—*L. B. Walton.*

699. PEARSON, KARL. Inheritance of psychical characters. *Biometrika* 12: 367-372. 1 pl. Nov., 1919.—The purpose of this article is to substantiate the claim of the inheritance

of psychical characteristics.—A group of 91 pairs of siblings from the orphan asylums of California has been tested by means of the Stanford Revision of the Binet-Simon method by Dr. Kate Gordon. The reason for selecting siblings from these orphan homes is because the environmental training has been the same for both, thus eliminating that factor of dispute of differential environment. By the table prepared from these results, a mean intelligence quotient (I. Q.) of 92.857 (or 93) ± 0.836 and a correlation of intelligence between the siblings of 0.508 ± 0.0524 are found.—The above results are compared with a table of data computed from the examination of 2801 pairs of siblings from all parts of England and all stations of life, by the "broad-category" method. The unit of this method is called the "mentace." Comparison of the two tables on equal basis was made by evaluating the mentace in terms of the I. Q. unit. A mentace is 1/100 part of the range which limits the category "Intelligent," or 0.1604 I. Q. units.—The results of the second table show a correlation of 0.515 which agrees excellently with the correlation of 0.508 of the first table.—Average genius is 50 I. Q. units above the mean I. Q. of 93 and the average mental defective is 50 I. Q. units below the mean I. Q. Thus also a person with absolute-zero intelligence would be exceedingly difficult to find, for even a low form of idiocy has a slight measurable intelligence. It is quite evident from the comparison of the above data that there is a hereditary factor in the intelligence-resemblance of siblings, and should dispel the prejudiced belief that this resemblance is due to differential environment.—*S. W. Prince.*

700. PEARSON, KARL. On generalized Tchebycheff theorems in the mathematical theory of statistics. *Biometrika* 12: 284-296. November, 1919.—Generalizes Tchebycheff's theorem for single variate in form

$$P > 1 - \frac{1}{\lambda^{2s}} \cdot \frac{\mu_{2s}}{\mu_2^s}$$

where P is chance of deviation being smaller than $\lambda\sigma$

For two variates, probability of an observation falling within ellipse χ_0

$$P > 1 - \frac{I_s}{\chi_0^{2s}}$$

where I_s involves high product moments. The theorems are tested empirically and found of little practical value, due both to labor involved and roughness of limits obtained.—*Sylvia Parker.*

701. PENNYPACKER, JOHN YOUNG. Observations in the beach plum, a study in plant variation. *Contrib. Univ. Pennsylvania Bot. Lab.* 4: 231-269. *Pl.* 66-70. 1919.—The beach plum, which occurs both along the seashore and inland, blossoms on the average about May 2, although certain shore forms do so as late as May 15. The writer indicates the marked variation in size, in mode of branching, in vigor of shoots, in time of appearance, in size and in hairiness of leaves, as well as in their blossoming. The flowers are androdioecious, and this evidently accounts for fruitless plants, others sparsely fruitful and still others full-bearing. The fruit varies greatly in size, color and palatability. Pure yellow fruits were collected, as well as red, purple, and large blue-black drupes. While the purple and blue-black fruits are often rich in tannin, the yellow fruits are comparatively poor in this. The future development of the fruit is considered promising.—*John W. Harshberger.*

702. PEZARD, A. Le conditionnement physiologique des caractères sexuels secondaires chez les oiseaux. Du rôle des glandes génitales. [The physiological conditioning of the secondary sexual characters in birds. The rôle of the genital glands.] *Bull. Biol. France et Belgique* 52: 176 p. 1 *pl.*, 79 *fig.* 1918.—A careful study of the problem from several angles, which may be reviewed under two heads. (1) Confirmation of previous observations in that the castrated cock retains the male characters except for failure of comb and wattles to develop, and the loss of crowing and sexual instinct. Similar observations were extended

to pheasants. Pullets, when completely castrated, developed male plumage and spurs.—(2) New results. A particular feature is the series of measurements involving body weight, and length of comb and spurs. In the castrated male the growth of the comb is directly proportional to the cube root of the body weight at corresponding ages, but in the intact cock, there is a marked acceleration at puberty in comb growth over the cube root of body weight. The rate of increase in length of spurs in both castrated and intact birds relative to body weight is the same. In males, castrated after complete sexual maturity, there is a loss of crowing and sexual instincts with a regression of comb and wattles, the latter proportional to the length of time following the operation.—Transplantation of testes, or what is more remarkable, the injection of extract of cryptorchid pig testes into castrated males results in the growth of comb and wattles and the reappearance of sexual and crowing instincts.—Pullets containing implanted testes developed large combs and wattles.—Several instances of gynandromorphism are described. The relation between castration, the liver, fat and glycogen formation is discussed, the theorem being developed that the testes elaborate a hormone for the utilization of fat in reproduction.—*H. D. Goodale.*

703. PIERPAOLI, I. Observations on the medlar tree flower and the origin of the stoneless medlar in Italy. *Atti R. Accad. Lincei Rend. Cl. Sci. Fis., Mat. e Nat.* 1: 121-125.

704. PITSCH, O. Erfelykheid en cultuur. Ik ben, ik leef, ik denk. (Heredity and culture. I am, I live, I think.) Mededeel. R. H. L. T. B. school. Wageningen 13: 105-204. 1918.—A philosophical treatment of the fundamental principles of heredity in their relation to culture, founded upon Descartes' "*cogito, ergo sum*," and following the lines of Hegel's philosophy. It is wholly impossible and from the viewpoint of the geneticist unnecessary to review the author's exposures.—*M. J. Sirks.*

705. PLACZEK. Die Bekämpfung vererbbarer Nervenkrankheiten. [The combating of hereditary nervous diseases.] *Zeitschr. Nerven.* 59: 1918.

706. PLAHN-APPIANI. Die Individualität von Zucker- und Futterrübe. [Individuality of sugar beets and fodder beets.] *Centralbl. Zuckerind.* 1919.

707. PLAHN-APPIANI. Das Wurzelgewicht der Beta-Rüben im züchterischen Sinne. [Weight of beet roots in a breeding sense.] *Centralbl. Zuckerind.* 1919.

708. POPENOE, WILSON. Improvement of the avocado by crossing. *California Citrograph* 3: 181. June, 1918.—Author briefly characterizes the three "races" of the avocado (*Persea americana*), the West Indian, Guatemalan, and Mexican, noting especially the commercial value of the fruit of the second and the hardiness and early ripening of the third. A supposed cross between the last two races is described, and the possibility that the variety Fuerte resulted from such a cross is mentioned.—*Howard B. Frost.*

709. PROFEIT, W. J. Cereal improvement at Svalöf. *Scotland Jour. Agric.* 1: 404-414. 1918.—Gives origin and purpose of Swedish Seed Association. Discussion of methods used for cereal improvement.—*H. H. Love.*

710. PRZIBRAM, HANS. Über experimentelle Vererbungsforschung. [Experimental studies on heredity.] *Sitzungsber. anthropol. Ges. Wien* 48: 47-51. 1918.—Author discusses briefly a number of results of experimental work in genetics, of interest to anthropologists. The physiology of animal pigmentation is discussed most extensively. An effect of high temperature on the coat color of rats (gray changed to red) is described. Heredity of the modified color was not tested. An increase in relative tail lengths of rats at high temperature was found not to be inherited.—*Sewall Wright.*

711. RABAUD, ETIENNE. La panachure du pelage et les phénomènes héréditaires chez la souris. [Variegation of the pelage and the phenomena of heredity in mice.] *Bull. Soc. Zool. France* 43: 49-56. 1918.—Mice bred to F_4 from wild gray \times albino (neither strain variegated),

showed irregular spotting in certain individuals. Criticism is made of ALLEN's "centers of pigmentation," MORGAN's "incomplete dominance," and BATESON's "disappearance of factors in certain areas." Environment may cause factors *A* (agouti) and *C* (color) to separate in certain cells thus producing white areas.—*P. W. Whiting.*

712. RAGIONIÉRI, ATTILIO. Improvement of *Richardia*. Gard. Chron. 66: 252-253. Fig. 116. Nov. 15, 1919.—*Richardia Rehmannii rosea* was pollinated by *R. Elliottiana*. Differentiating characteristics were: Small, proliferous, *versus* large tubers; narrow, lanceolate, short-petioled, *versus* broad, hastate, long-petioled leaves; few, small, whitish-green, linear markings, *versus* numerous whitish blotches on the leaves; small, short-stalked, nearly closed, *versus* large, long-stalked, well open spathes; and light rosy violet, *versus* yellow spathe-color. The characteristics of *R. Elliottiana* are given last, and are said to be dominant, except for the yellow color which is "almost recessive." Eighteen of the F_1 plants were alike, and had pale cream and rosy violet spathes. The remaining 2 plants were dwarfed and did not flower. In F_2 there were some plants with large well-opened spathes, rosy-violet, purple, orange-yellow, and yellow shaded violet. The leaves varied greatly in size, and in shape from lanceolate to hastate. Some F_2 plants had uniform green leaves without light spots or lines.—The above two species crossed readily with *R. albomaculata*, but could not be crossed with *R. africana*.—*John Belling.*

713. RAUNKIAER, C. Über die verhältnismässige Anzahl männlicher und weiblicher Individuen bei *Rumex thyrsiflorus* Fingerh. [On the relative number of male and female individuals in *Rumex thyrsiflorus* Fingerh.] Kgl. Danske Videnskabernes Selskab. Biol. Meddel. 1: 3-17. 1918.—In *Rumex thyrsiflorus* the percentage of female plants is distinctly higher than that of the male plants, the female percentage being between 70 and 95. Differences as to the female percentage are found in different elementary species of *Rumex thyrsiflorus*, some of them being rich in females and some others (relatively) poor. Differences as to the percentage are found from year to year in the same elementary species. The numerical proportion of females to males depends mainly, or entirely, upon the female. The male plants, where differences are found at all, flower earlier than the females. Pollination within the single elementary species seems to weaken the progeny in such way that it flowers later than the progeny from crosses with plants of another elementary species.—*Ø. Winge.*

714. RENNER, O. Ueber Sichtbarwerden der Mendelschen Spaltung im Pollen von *Oenotherabastarden*. [On the visibility of Mendelian segregation in hybrids of *Oenothera*.] Ber. Deutsch. Bot. Gesell. 37: 129-135. 1919.—*Oenothera Lamarckiana* has distinctly larger pollen grains than *O. muricata*. In each case the frequency curve has a single and pronounced mode. The starch grains of the pollen in the former species are elongated and spindle-form, in contrast to the shorter, plumper grains of the latter. The hybrid *O. (Lamarckiana* \times *muricata*) *gracilis* has pollen of two types, one like each parent. The frequency curves for size overlap, but the decisive starch-grain difference shows that the two types of microspores occur in equal numbers. The frequency distribution of sizes has two well marked modes, separated from one another by the same interval as that between the modes for the unhybridized parent forms. It is known that the pollen of the hybrid is genetically of two types. The possibility of observing segregation in the microspores is of the highest possible importance in working out the riddles presented by twin hybrids and other hybridization phenomena in *Oenothera*.—*H. H. Bartlett.*

715. RENNER, O. [German rev. of: ATKINSON, G. F. Quadruple hybrids in the F_1 generation from *Oenothera nutans* and *Oe. pycnocarpa*, with the F_2 generations, and back crosses and intercrosses. Genetics 2: 213-260. 16 fig. 1917.] Zeitschr. indukt. Abstamm. Vererb. 21: 186-187. Sept., 1919.

716. RENNER, O. [German rev. of: HERIBERT-NILSSON, NILS. Experimentelle Studien über Variabilität, Spaltung, Artbildung und Evolution in der Gattung *Salix*. (Experimental

studies on variability, segregation, speciation and evolution in the genus *Salix*.) Lunds Univ. Arsskrift N. F. Afd. 2. 14: (No. 2S): 1-145. 65 fig. 1918.] Biol. Zentralbl. 39: 479-480. Oct., 1919.

717. RENNER, O. [German rev. of: LOTSY, J. P. *De Oenotheren als kernchimeren*. (The *Oenotheras* as nuclear chimeras.) *Genetica* 1: 7-69. 1919.] *Zeitschr. indukt. Abstamm. Vererb.* 21: 183-184. Sept., 1919.

718. RENNER, O. [German rev. of: RAUNKIAER, C. *Über den Begriff der Elementarart im Lichte der modernen Erblchkeitsforschung*. (On the concept of elementary species in the light of modern genetical investigations.) *Zeitschr. indukt. Abstamm. Vererb.* 19: 225-240. 2 fig. 1918.] *Zeitschr. Bot.* 11: 474-475. 1919.

719. RENNER, O. [German rev. of: TISCHLER, G. *Analytische und experimentelle Studien zum Heterostylie-problem bei Primula*. (Analytical experimental studies on the problem of heterostyly in *Primula*.) *Festschr. z. Feier des 100-Jährigen Bestehens der Kgl. Württ. Landwirtsch. Hochschule Hohenheim*. p. 254-273. 4 fig. April, 1918. *Ibid.* *Das Heterostylie-Problem*. (The problem of heterostyly.) *Biol. Zentralbl.* 38: 461-479. Nov., 1918. (See *Bot. Absts.* 4, Entries 789, 790.)] *Zeitschr. Bot.* 11: 475-476. 1919.

720. RITTER, WILLIAM EMERSON. *The unity of the organism*. 2 vol. 14 × 20 cm., ix + 398, ix + 408 p., 61 fig. Richard G. Badger: Boston, 1919.—This work is devoted to elaboration of "organismal," as opposed to "elementalistic" point of view. Author's main thesis is that organism as a whole is the unit, and is not explained merely by combined action of parts into which it can be analyzed. Whole no more to be causally explained by interaction of parts than parts by whole. In relation to genetics, author holds that the mechanism of heredity is as much a part of and subordinate to the organism as are all of its other parts and organs. Chromosomes, even though they may be bearers of heredity, are causally explained by organism in same sense that heredity attributes of organism are causally explained by chromosomes. Author recognizes that not many of major theories in biology are more securely established than that hereditary attributes in bisexually propagating organisms are in some way and to some extent dependent upon chromosomes of germ-cells. He even recognizes possibility (though regarding this as far from proved) that chromatin of sperm nucleus may "carry" all the hereditary potentialities derived from male parent. But this does not cover case of protozoa, for which he offers evidence that heredity is not wholly conditioned by nucleus; nor does it cover asexually reproducing plants and animals, which are too largely overlooked by geneticists. Here cytoplasmic characters are seen to be carried over directly, and the claim that cell nuclei are, despite appearances, the really effective and responsible agents is not in accordance with legitimate scientific procedure. Hence cytoplasm, no less than chromatin, is entitled to be regarded as "hereditary substance." Another reason for so regarding it is that in all cases the working out of the hereditary process in ontogeny (be it initiated by chromosomes or not) is dependent upon processes occurring in cytoplasm. Latter, therefore, is an integral part of the hereditary mechanism.—In discharge of this function, cytoplasm must have antedated chromatin. Heredity is coextensive with organic propagation and development, while "carrying heredity" by chromosomes is very far from a universal phenomenon.—Author protests against restricting studies of heredity so largely to adult characters. Present evidence comes from observations on germ-cell stages at one end and on adult stages at other end of ontogenetic series. He urges importance of recognizing heredity as working by transformation rather than transmission, and insists upon importance of detailed embryological studies of origin and growth of hereditary characters. Some illustrative cases of this mode of procedure are cited.—Author takes issue with contention that organism does not truly produce its own germ cells and contends that the hereditary substance becomes such, in some way, through being subject to metabolic processes common to whole organism. He does not, however, lay much stress on "inheritance of acquired characters," though not denying its possibility.—F. B. Sumner.

721. RIVIERE, G., AND G. BAILHACHE. *L'Amygdalopersica Formonti*. Compt. Rend. Acad. Sci. Paris 168: 525. 1919.—This graft hybrid produced a fertile seed from which was grown a shrub, now three years old, which exhibits solely the characteristics of an almond particularly in regard to its leaves. Three more fertile seeds were produced in 1917 on the spontaneously arisen almond branches. These have also produced young vigorous almond trees.—*E. B. Babcock*.

722. ROBERTS, HERBERT F. A Darwinian statement of the Mendelian theory. Nature 103: 463-464. Aug. 14, 1919.—Extracts from "Animals and plants under domestication;" explanation of reversion in F_2 through recombination of dormant grandparental gemmules.—*Merle C. Coulter*.

723. ROBERTS, HERBERT F. A demonstration of the coefficient of correlation, for elementary students of plant breeding. School Sci. and Math. 19: 619-628. 6 fig. 1919.—A demonstration of the meaning of the correlation coefficient. A geometric and trigonometric explanation is given. "The value of the correlation coefficient is always the value of the tangent of the angle which the correlation line forms with the axis of X, where it passes through the point of intersection of the axes X and Y." The numerical relation between the tangent and correlation coefficient is shown. The illustrations and discussions will bring out more forcibly the meaning of the correlation coefficient.—*H. H. Love*.

724. ROBERTS, HERBERT F. An improved colorimeter for color inheritance study. Plant World 22: 262-269. 4 fig. Sept., 1919.—Author describes (using construction diagrams) improvement on a common tintometer, to make it more readily available to geneticists. Most important change is addition of mechanism for revolving colored material to eliminate effects of inequalities of surface. Recommends use of artificial light and ascertaining by voltmeter that current for it is constant.—*James P. Kelly*.

725. ROSENDAHL, C. O. Variations in the flowers of *Erythronium propullans* Gray. Torrey 19: 43-47. 3 fig. Mar., 1919.—Stamens 2 to 6, mode 4; perianth segments 4 to 6; mode 4; taxonomic relatives fairly constant 6 in both cases. [See Bot. Absts. 3, Entry 340.]—*Merle C. Coulter*.

726. RUSSELL, ALICE MARY. The macroscopic and microscopic structure of some hybrid *Sarracenias* compared with that of their parents. Contrib. Univ. Pennsylvania Bot. Lab. 5: 3-41. Pl. 1-5. 1919.—The writer finds that the hybrid forms of *Sarracenia* studied in comparison with their parents are intermediate in relation in almost all details. This is shown in the size of the plants, in the shape of the pitchers, in the blending of the placental lid shapes, in the matter of coloring, in the matter of the size and shape of the flowers (especially petal shape and size), in the odor, etc. All of the above examples of the blending of parental characters can be seen with the naked eye. The microscopic details show also the intermediate condition of the hybrids in the epidermal cells of the outer pitcher surfaces, in the epidermal cells of the conducting surface, in the number of stomata, in the unicellular hairs and hairs on the detentive and inner lid surfaces, in the microscopic structure of the pitcher rim, in the thickness of the leaves, and in other details. Other peculiarities are noted under the caption bisexual hybridity.—*John W. Harshberger*.

727. RUTGERS, A. A. L. Selectie en uitdunning. [Selection and thinning.] Arch. Rubercult. Nederlandsch-Indië 3: 105-118. 1919.—See Bot. Absts. 3, Entry 2051.

728. SAND, KNUD. Experiments on the internal secretion of the sexual glands, especially on experimental hermaphroditism. Jour. Physiol. 53: 257-263. Dec. 3, 1919.—Abstract of a monograph by the author, the Danish title as given in the references being, "Experim. Studier over Kons-Karakterer hos Pattedyr. Copenhagen, 1918."—Author has repeated and confirmed STEINACH's experiments on guinea-pigs and rats. Castrated males with implanted ovaries became feminized, and castrated females with implanted testes became masculin-

ized. Artificial hermaphrodites were produced, which exhibited development of both sets of characters (penis and mammae). The psychical condition exhibited varied according to the animals with which the hermaphrodite was in contact. Using a new method, i.e., placing ovaries inside the testes, artificial ovo-testes were produced thus showing that no antagonism exists between the two sorts of sexual organs.—*H. D. Goodale.*

729. SAUNDERS, A. P. The preservation of pollen for hybridizing. *Bull. Peony News* 6: 2-9. 1918.—Review of experimental results on longevity of pollen. Tomato pollen is often kept from late summer flowers for use on green-house plants following winter. Grape pollen is viable for two months; date palm, a year or more; carnation pollen in close stoppered bottles is viable for several weeks; *Cheiranthus cheiri*, 14 days (Kölreuter). Mentions GÄRTNER's elaborate experiments on longevity of viability in pollen. PFUNDT's methods of testing pollen viability are much shorter, less work, and probably give just as accurate results as the longer, more laborious method of earlier workers, such as Gärtner. Pollen of many species germinates in 15 to 20 per cent concentration of cane sugar in water. Hanging drop culture of pollen in this solution germinates in a few hours if viable. Pollen-tube formation is much slower in old pollen than in fresh pollen. Pfundt found in numerous experiments, longevity of viability of pollen was greatly influenced by humidity—wet weather decreasing, and dry weather increasing the longevity of viability. Pure concentrated sulphuric acid in a desiccating vessel gives very near zero humidity. 54 per cent acid + 46 per cent water gives about 30 per cent humidity (roughly dry-weather conditions). 37 per cent acid + 63 per cent water gives 60 per cent humidity (roughly moist weather). 15 per cent acid + 85 per cent water give 90 per cent humidity (muggy, rainy weather conditions).—Pfundt kept pollen samples in dark at room temperature (ordinarily 65°F.) in desiccating vessels containing various per cents of sulphuric acid and water mixture. Longevity of viability of pollen of various species belonging to 6 very distinct orders tested by the above methods is tabulated. Pollen of *Prunus avium* in ordinary air of room remained viable 28 days; in 90 per cent humidity, 12 days; in 60 per cent, 25 days; in 30 per cent, 102 days; in zero humidity, 126 days. Pollen of grasses (*Zea*, *Poa*) thus tested remained viable only one day under any of these conditions. Genera tested were *Colchicum*, *Hemerocallis*, *Tulipa*, *Galanthus*, *Iris*, *Peonia*, *Trollius*, *Zea*, *Poa*, *Prunus*, *Lupinus*, *Viola*, *Primula*.—Wetting pollen, even for a short time, often markedly decreases length of viability. Pollen of garden nasturtium (*Tropaeolum*) wetted two minutes then artificially dried, remained viable only 2 days against 88 days for unwetted sample. Pollen tubes in most plants are not formed at low temperatures, but in such flowers as *Crocus*, *Snowdrop* (*Galanthus*) and Christmas Rose (*Helleborus*), pollen forms tubes at 40°F. Cane-sugar solutions should be sterilized by heating, as pollen is very susceptible to mould. When perfectly fresh, only about 20 to 30 per cent of pollen is viable. Light frosts are not fatal to pollen vitality. Subjected to 29-30°F. for several hours, pollen still retains much of its original viability. Peony pollen long-lived, making crosses between early and late varieties possible and shipment practicable. Directions are given for crossing peonies.—*O. E. White.*

730. SCHADELIN, W. Wirtschaftliche Zuchtwahl. [Practical selection.] *Schweiz. Zeitschr. Forstwesen* 70: 101-103. 1919.

731. SCHEURER, P. Zum Problem der Geschlechtshersage. [Contribution to the problem of sex-prediction.] *Correspl.-Blatt Schweizer Ärzte* 48: 1473-1483. No date.

732. SCHLEIP, W. [German rev. of: KAMMERER, PAUL. Vererbung erzwungener Formveränderungen. I. Die Brunftschwiele des Alytes-Männchen aus "Wassereiern." (Inheritance of induced changes of form. I. The callosities of the Alytes males from "water-eggs.") *Arch. Entwicklungsmech. Org.* 45: 323-370. Pl. 10-11. 1919. (See Bot. Absts. 4, Entry 757.)] *Zeitschr. induct. Abstamm. Vererb.* 21: 174-179. Sept., 1919.

733. SCHOUTEN, S. L. Variabilität by schimmels. (Variability in Eumycetes.) *Handel. 16e Nederl. Natuur-en Geneeskundig Congres's Gravenhage* 16: 270-272. 1918.—Cases of "mutation" found by the writer in his cultures of various Eumycetes, may be grouped in this way:

A. In the original culture one or more abnormal growing portions become macroscopically visible. These abnormally growing parts of the mycelium may be isolated and cultivated in new cultures ("downform" of *Favus*, further in *Penicillium*, *Cephalothecium roseum*, *Torula*, *Cladosporium herbarum*).

B. In the original culture some abnormal cells develop, that may be isolated and cultivated; these cases belong to two different groups:

a. In this new culture the fungus remains sometime in a period of difficulties in growing, resulting in a dwarf form: *Rhizopus oryzae* a.o.

b. The cell is not feeble, but is abnormal in form, constitution, cellwall etc., a well-growing new culture arises: *Dematium pullulans*, *Phycomyces nitens*.

A remarkable case is described by the writer in *Aspergillus Wentii*; the species has two forms of conidiophores, one of 2 to 3 mm. the other 10 mm. in length. The cultures, resulting from these different conidia, are different in very remarkable features; a culture from both forms of conidia mixed gives the normal culture of the fungus.—*M. J. Sirks*.

734. SCHOUTEN, S. L. [Dutch rev. of: HAGEDOORN, A. L., AND A. C. HAGEDOORN-VORSTHEUVEL LA BRAND. *Het overgeërfd moment bij bacterieele ziekten*. (The inherited factor in bacterial infection.) *Nederl. Tijdschr. voor Geneesk.* 63: 179-182. 1919.] *Genetica* 2: 61-62. Jan., 1920.

735. SCHOUTEN, S. L. [Dutch rev. of: SCHERMERS, D. *Erfelijkheid en rasverbetering*. (Heredity and race-improvement.) *Schild en Pijl*. 1919.] *Genetica* 2: 81-82. Jan., 1920.

736. SCHOUTEN, S. L. [Dutch rev. of: TAMMES, T. *De leer der erfactoren en hare toepassing op den mensch*. Rede, uitgesproken bij het aanvaarden van het ambt van buitengewoon hoogleraar aan de Rijks-Univ. te Groningen. (The theory of hereditary factors and its applicability to man. Address, delivered on assumption of the office of Professor Extraordinarius in the State University at Groningen.) Wolters: Groningen, 1919.] *Genetica* 2: 84-85. Jan., 1920.

737. SCHRIBAUX. [Rev. of: AUMIOT, J. *Les mutations gemmaires culturales des Solanum tubérifères sauvages*. (Bud mutations of the wild tuber-bearing Solanum.)] *Compt. Rend. Acad. Agric. France* 5: 289-293. 1919.

738. SEYSTER, E. W. Eye facet number as influenced by temperature in the bar-eyed mutant of *Drosophila melanogaster* (ampelophila). *Biol. Bull.* 37: 168-182. 1 pl. Sept., 1919.—This analysis of the effect of temperature on facet number in the bar-eyed mutant race of *Drosophila melanogaster* indicates that facet number bears an inverse relationship to temperature,—low temperatures resulting in high facet number and *vice versa*. It also indicates that the critical period precedes the pupal stage,—changes in temperature subsequent to pupation have no effect. Flies were reared at temperatures ranging from 15° to 30°C.; facet number changed on average of 5.2 to 8.9 per degree of temperature change. It is suggested that causal agent is a chemical acting as an inhibitor of facet formation and varying its speed of action with changes in temperature according to van't Hoff's law. With each 10° drop in temperature between 29° and 15° facet number increased on average 2.6 times in males and 3.5 times in females. Light and amount of food apparently have little or no effect on facet number.—*Chas. W. Metz*.

739. SHAMEL, A. D. A performance-record Lisbon lemon orchard. *California Citrograph* 3: 75, 78. 1 table, 2 fig. Feb., 1918.—Author describes a remarkably uniform and productive lemon orchard, which was planted entirely with trees budded from a single superior parent tree.—*Howard B. Frost*.

740. SHAMEL, A. D. Better California grapefruit. *California Citrograph* 3: 94, 115, 116. 4 fig. Mar., 1918.—Author discusses variant types of the Marsh variety; attributes recent improvement in market for California grapefruit to better maturity, better packing, and extensive elimination from orchards of the trees of undesirable types.—*Howard B. Frost*.

741. SHAW, J. K., AND J. B. NORTON. The inheritance of seed-color coat in garden beans. Massachusetts Agric. Exp. Sta. Bull. 185: 58-104. 1918.—A record of the inheritance of seed coat color as indicated by crosses involving twenty-one different varieties of garden beans. The inheritance of pigments and of pigment patterns were investigated. No relationship was found to exist between the behavior of these two characters, each being controlled by distinct factors. The genetic composition of the different varieties with respect to both pigments and pigment pattern is listed according to the factorial hypothesis advanced by the authors to account for the observed results.—G. P. McRostie.

742. SHULL, G. H. Sterility and self and cross incompatibility in shepherd's purse. Science 49: 547. 1919.—Portion of author's abstract of paper read before the American Philosophical Society, April 25, 1919. Sexual reproduction is complex succession of processes, which may be broken at any one of a number of different points. Sterility may therefore result in different ways that can not be brought under a common viewpoint. Many biotypes of *Bursa bursa-pastoris* display unique characteristics with respect to sterility and fertility. Most biotypes from Europe and North Eastern America have the lower flowers of the central axis nearly always completely sterile. A form common on the Pacific coast of North and South America and extending at least as far eastward as Tucson, Arizona, has no sterile flowers at base of raceme. Cross between an east American biotype and the Pacific coast form gave an F_1 partially sterile, with a rhythmic succession of fertile and sterile flowers. In F_2 about one in sixteen resembled one P_1 , and a like number resembled the other P_1 , while 14 again showed a rhythmic succession, thus suggesting the interplay of two genetic factors.—Geo. H. Shull.

743. SIEMENS. [Rev. of: CLASSEN, K. Vererbung von Krankheiten und Krankheitsanlagen durch mehrere generationen. [Inheritance of diseases and disease primordia through several generations.] Arch. Rassen.- u. Gesellschaftsbiol. 13: 31-36. 1918.] Zeitschr. induct. Abstamm. Vererb. 21: 122-123. July, 1919.

744. SIEMENS. [German rev. of: KLAUSNER, PRIV.-DOZ. DR. E. Über angeborene bzw. hereditäre Zystenbildung im Bereiche der Talgdrüsen. (On congenital or hereditary formation of cysts from the sebaceous follicles.) Dermatolog. Wochenschr. 65: 711. 1917.] Zeitschr. induct. Abstamm. Vererb. 22: 144. Jan., 1920.

745. SIEMENS. [Rev. of: LENZ, DR. FRITZ. Über dominantgeschlechtsbegrenzte Vererbung und die Erbllichkeit der Basedowdiathese. (On dominant sex-linked heredity and the inheritance of Basedow's disease.) Arch. Rassen.- u. Gesellschaftsbiol. 13: 1-9. 1918.] Zeitschr. induct. Abstamm. Vererb. 21: 123-124. July, 1919.

746. SIEMENS. [Rev. of: PAULSON, DR. JENS. Über die Erbllichkeit von Thoraxanomalien mit besonderer Berücksichtigung der Tuberkulose. (On the inheritance of anomalies of the thorax with special reference to tuberculosis.) Arch. Rassen.- u. Gesellschaftsbiol. 13: 10-31. 1918.] Zeitschr. induct. Abstamm. Vererb. 21: 122. July, 1919.

747. SIEMENS. [Rev. of: STIEVE, DR. H. Über Hyperphalangie des Daumens. (On hyperphalangy of the thumb.) Anat. Anzeiger 48: 64. Dec., 1919.] Zeitschr. induct. Abstamm. Vererb. 22: 64. Dec., 1919.

748. SIEMENS. [Rev. of: WOLFF, DR. FRIEDRICH. Ein Fall dominanter Vererbung von Syndaktylie. (A case of dominant inheritance of syndactyly.) Arch. Rassen.-u. Gesellschaftsbiol. 13: 74-75. 1918.] Zeitschr. induct. Abstamm. Vererb. 21: 122. July, 1919.

749. SILVER, ALLEN. Finch hybrids. Avic. Mag. 10: 98. Mar., 1919.—Author is investigating reported hybrids between Twite and Redpoll, Goldfinch and Twite, and Chaffinch and Canary. Reports a Twite-Goldfinch hybrid with observations on F_1 characters.—E. B. Babcock.

750. SIMONS, A. *Familiäre Trommelschlegelbildung und Knochenhypertrophie.* [Familial formation of drumstick fingers and hypertrophy of the joints.] *Deutsch. Zeitschr. Nervenheilk.* 59: 1918.

751. SIRKS, M. J. *De erfelykheidsbeschouwingen van Carl von Naegeli.* (1817-1891.) [Carl von Naegeli's (1817-1891) conceptions of heredity.] *De Tydspiegel.* 75: 265-283. 1918.—The greater part of modern botanists and geneticists know Naegeli's conceptions of heredity only from his most important work: *Mechanisch-physiologische Theorie der Abstammungslehre.* But the philosophical manner of treatment in this work, denied by Naegeli himself as being a well-founded way, is notwithstanding a hindrance for right appreciation of his attitude towards the problems of evolution; his earlier papers (published in *Sitzungsberichte kön. Akad. d. Wissensch. München*, 1865, 1866, 1872, 1874 and *Entstehung und Begriff der Naturhistorischen Art.* München, 1865) give us a widely different opinion about his conceptions. Naegeli in these years was a sharp anti-Lamarckian; though being a florist, he could not agree with the general florists' opinion of the origin of new species and varieties by acclimatization. A fundamental difference between species and varieties does not exist in his opinion; their origin is of the same character. He makes in these previous papers a beginning with development of his "idioplasma"-theory; it is still in embryonal form and its further building has not yet begun. That is a great profit of these papers; the mystical "Vervollkommungstrieb" of his later conceptions has not yet been born. Instead of this he seeks a rich source of new varieties in hybridization; he knows the variability of F_2 generations though, perhaps as a result from the misleading hybridization-experiments in *Hieracium*, he did not think this hybridization was a factor in the evolutionary process. His original papers before 1875 contain much more sane and critical remarks than did his greater work of 1884.—M. J. Sirks.

752. SIRKS, M. J. [Dutch rev. of: DÜRKEN, BERNHARD. *Einführung in die Experimentalzoologie.* (Introduction to experimental zoology.) $x + 446$ p., 224 fig. Julius Springer: Berlin, 1919.] *Genetica* 2: 55-58. Jan., 1920.

753. SIRKS, M. J. [Rev. of HONING, J. A. *Een steriele dwergform van Deli-tabak, ontstaan als bastaard.* (A sterile dwarf form of Deli tobacco originated as a hybrid.) *Bull. Deli-proef. Medan. Sumatra* 10: 24 p., 3 pl., 1917.] *Zeitschr. induct. Abstamm. Vererb.* 22: 60. Dec., 1919.

754. SIRKS, M. J. [Dutch rev. of: HOUWINK, R. HZN. *Erfelijckheid.* Populaire beschouwingen omtrent het tegenwoordige standpunt der erfelijckheid, verzameld uit theorie en practijk. (Heredity. Popular presentation of the present status of heredity compiled from theory and practice.) Assen. Stoomdrukkerij Floralia 1919: 1-62. 5 pl., 1919.] *Genetica* 2: 63. Jan., 1920.

755. SIRKS, M. J. [Dutch rev. of: KAJANUS, B. *Genetische Studien über die Blüten von Papaver somniferum L.* (Genetical studies on the flowers of *Papaver somniferum L.*) *Ark. Bot. K. Svensk. Vetenskapsakad.* 15: 1-87. 3 pl. 1919.] *Genetica* 2: 64-65. Jan., 1920.—See Bot. Absts. 3, Entry 2147.

756. SIRKS, M. J. [Rev. of: KAJANUS, B. *Elementär ärftlighet lära.* (Elementary genetics.) 88 p. P. A. Norstedt and Söner: Stockholm, 1917.] *Genetica* 1: 555. Nov., 1919.

757. SIRKS, M. J. [Dutch rev. of: KAMMERER, P. *Vererbung erzwungener Formveränderungen.* 1. Die Brunftschwiele des Alytes-Männchen aus "Wassereiern." (Inheritance of induced changes of form. 1. The callosities of the Alytes males from "water-eggs.") *Arch. Entwicklungsmech. Org.* 45: 323-370. Pl. 10-11. 1919.—MACBRIDE, E. W. The inheritance of acquired characters. *Nature* 103: 225. May 22, 1919.—BATESON, W. Dr. Kammerer's testimony to the inheritance of acquired characters. *Nature* 103: 344-345. July 3, 1919.] *Genetica* 2: 65-67. Jan., 1920.—See Bot. Absts. 4, Entry 732.

758. SIRKS, M. J. [Dutch rev. of: MACLEOD, J. *The quantitative method in biology.* 15 × 23 cm., v + 228 p., 27 fig. Longmans, Green & Co.: New York. 1919.] *Genetica* 2: 69-71. Jan., 1920.
759. SIRKS, M. J. [Rev. of: MAYER-GMELIN, H. *Mededeelingen omtrent enkele kruisings en veredelingsproefnemingen.* (Reports on several experiments in crossing and selection.) *Cultura* 30: 1-19. 4 pl. 1918. (See also Bot. Absts. 4, Entry 675.)] *Zeitschr. induct. Abstamm. Vererb.* 22: 60-61. Dec., 1919.
760. SIRKS, M. J. [Rev. of: REINERS, J. H. TH. *De studie der afstammingen der bloedlynen en de karakteristiek van onze rundveerassen.* (The study of descendance and blood-lines and the characteristics of our races of cattle.) *Cultura* 30: 328-353. 1918.] *Zeitschr. induct. Abstamm. Vererb.* 22: 63. Dec., 1919.
761. SIRKS, M. J. [Dutch rev. of: SCHMIDT, JOHANNES. *Der Zeugungswert des Individuums beurteilt nach dem verfahren kreuzweiser Paarung.* (Individual potency based on experience in crossmatings.) 8vo., 40 p. Gustav Fischer: Jena, Germany, 1919. (See Bot. Absts. 3, Entry 2190.)] *Genetica* 2: 82-83. Dec., 1919.
762. SIRKS, M. J. [Rev. of: TAMMES, T. *De veredeling van het vlas in Nederland.* (Flax breeding in Holland.) *Mededeel. Ver. Wetenschapp.* 9: 19 p. 1918. (See Bot. Absts. 3, Entry 1519.)] *Zeitschr. induct. Abstamm. Vererb.* 22: 61-62. Dec., 1919.
763. SIRKS, M. J. [Dutch rev. of: THOMSON, J. A. *Heredity.* 3rd ed., 627 p., 47 fig. J. Murray: London, 1919.] *Genetica* 2: 85-87. Jan., 1920.
764. SIRKS, M. J. [Rev. of: TJEBBES, K., AND H. N. KOOIMAN. *Erfelykheidsonderzoekingen by boonen.* (Genetical experiments with beans.) *Genetica* 1: 323-346. 1919.] (See also Bot. Absts. 3, Entry 1041.) *Zeitschr. induct. Abstamm. Vererb.* 22: 63-64. Dec., 1919.
765. SIRKS, M. J. [Rev. of: VAN HERWERDEN, M. A. *De terugkeer van een sedert zeven jaar verdwenen kenmerk in een cultuur van Daphnia pulex.* (The return of a characteristic which had disappeared for seven years in a culture of *Daphnia pulex*.) *Genetica* 1: 321-322. 1919. (See also Bot. Absts. 3, Entry 1043.)] *Zeitschr. induct. Abstamm. Vererb.* 22: 62-63. Dec., 1919.
766. SIRKS, M. J. [Dutch rev. of: VAN DER WOLK, P. C. *Onderzoekingen over blyvende modificaties en hun betrekking tot mutaties.* (Researches on permanent modifications and their relations to mutations.) *Cultura* 31: 82-105. 1 p. 1919. (See Bot. Absts. 3, Entry 296; 4, Entry 767.)] *Genetica* 2: 94-96. Jan., 1920.
767. SIRKS, M. J. [Rev. of: VAN DER WOLK, P. C. *Onderzoekingen over blyvende modificaties en hun betrekking tot mutaties.* (Experiments on persistent modifications and their relations to mutation.) *Cultura* 31: 82-105. 1919. (See Bot. Absts. 3, Entry 296; 4, Entry 766.)] *Zeitschr. induct. Abstamm. Vererb.* 22: 58-60. Dec., 1919.
768. SIRKS, M. J. [Dutch rev. of: WINGE, Ø. *On the non-Mendelian inheritance in variegated plants.* *Compt. Rend. Trav. Lab. Carlsberg* 14: 1-20. 4 fig. 1919. (See Bot. Absts. 3, Entry 306.)] *Genetica* 2: 91-92. Jan., 1920.
769. SIRKS, M. J. [Dutch rev. of: WINGE, Ø. *On the relation between number of chromosomes and number of types, in Lathyrus especially.* *Jour. Genetics* 8: 133-138. Pl. 5. Apr., 1919. (See Bot. Absts. 3, Entry 307.)] *Genetica* 2: 92-93. Jan., 1920.
770. SLOCUM, R. R. *Breeding poultry for standard and utility values.* *Reliable Poultry Jour.* 26: 57, 103, 104. 4 fig. 1919.—Author states that there has been a tendency among poultry breeders to split into two factions,—the fancy and the utility breeders. The reasons for

this are briefly discussed. Author takes stand that standard and utility requirements are not opposed, but that they may easily be combined and that breeders should give the matter more careful attention. As an example of what can be done in this direction author cites instances observed at the Government Poultry Farm at Beltsville, Md.—*Philip B. Hadley*.

771. SMITH, BETRAM G. The individuality of the germ-nuclei during the cleavage of the egg of *Cryptobranchus alleghehiensis*. Biol. Bull. 37: 246-286. 9 pl. Oct., 1919.—In the fertilization of the egg of *Cryptobranchus alleghehiensis* the germ nuclei do not fuse and in the first division of the egg the chromosome groups are separate. Individuality of germ nuclei has been traced to an advanced cleavage stage.—*Karl Sax*.

772. STAKMAN, E. C., H. K. HAYES, O. S. AAMODT, AND J. G. LEACH. Controlling flax wilt by seed selection. Jour. Amer. Soc. Agron. 2: 291-298. Pl. 9. 1919.—The authors believe that the decreased production of flax and the gradual movement of the center of production to new lands is caused chiefly by the ravages of the flax wilt (*Fusarium lini* Bolley). Selection of wilt-resistant varieties is offered as a solution of the flax-wilt problem. Such selection work has been carried on in Minnesota since 1911. Varieties have been obtained which show marked resistance to this disease. Plants were grown on infested ground and as a rule bulk selection of seed from resistant plants was followed. This seed was planted again on infested soil and additional selections made. Only one strain of the wilt-producing organism has appeared and selections resistant at St. Paul, Minnesota, have also proved resistant at Watseka, Minnesota. A seed-plot method is recommended for the flax producer by which seed for the general crop is selected each year from plants grown the previous year on a small plot of land badly infested with the wilt-producing organism.—*G. P. McRostie*.

773. STECHE, O. Grundriss der Zoologie. [Foundation of zoology.] 508 p. Veit u. Co.: Leipzig. 1919.

774. STEIN, E. [German rev. of: NUTTALL, J. S. W. A note on the inheritance of colour in one breed of pigeons—an attempt to demonstrate a Mendelian type of transmission. Jour. Genetics 7: 119-124. 1918. (See Bot. Absts. 1, Entry 234.)] Zeitschr. induct. Abstamm. Vererb. 21: 179. Sept., 1919.

775. STEIN, E. [German rev. of: PUNNETT, R. C., AND P. G. BAILEY. Genetic studies in poultry. I. Inheritance of leg-feathering. Jour. Genetics 7: 203-213. 1918. (See Bot. Absts. 1, Entry 492.)] Zeitschr. induct. Abstamm. Vererb. 21: 179. Sept., 1919.

776. STEIN, E. [German rev. of: JONES, W. N., AND M. C. RAYNER. Mendelian inheritance in varietal crosses of *Bryonia dioica*. Jour. Genetics 5: 203-222. 1916.] Zeitschr. induct. Abstamm. Vererb. 21: 189. Sept., 1919.

777. STIEVE, DR. H. Über Hyperphalangie des Daumens. [On hyperphalangy of the thumb.] Anat. Anzeiger 48: 64. Dec., 1919.—See Bot. Absts. 4, Entry 747.

778. STOMPS, THEO. J. Gigas-mutation mit und ohne Verdoppelung der Chromosomenzahl. [Gigas mutation with and without doubling of the chromosome number.] Zeitschr. induct. Abstamm. Vererb. 21: 65-90. 3 pl., 4 fig. July, 1919.—Studies on chromosome numbers of *semi-gigas* and *gigas* mutations in *Narcissus*. *N. poeticus* L., *N. poeticus poetarum* and *N. poeticus ornatus*, diploid number 16, present difficulties in counting. One pair of "companion" chromosomes ("Trabanten") are attached to a longer pair at metaphase. Apparent count is thus 14, true count, 16. *N. poeticus poetarum* mut. "Glory of Lisse" and "Albion," *semi-gigas* and *gigas* forms, respectively, as shown by comparison of their characters with analogous forms of *Oenothera* (two tables of cell measurements and photographs of plants, pollen and epidermis are given), have the normal diploid number of chromosomes. *N. biflorus* Curt. found growing wild near *N. poeticus* is triploid and is a natural hybrid between a tetraploid *N. poeticus* mut. *gigas* and *N. tazetta*.—Theory is developed that since, in *Narcissus*, *Primula sinensis* (Gregory) and *Oe. Lamarckiana* mut. *gigas*, individuals are

known some with and some without doubling of chromosome number, such doubling is not the cause of the mutation but a character of the mutant. Chromosome number may also be a character of an intermediate triploid species. Within a species, variation in number is analogous to the occasional production of, e.g., 4 leaves in a trifoliate species.—Tetraploid "mut. *gigas*" graft hybrid of *Solanum nigrum* and *S. lycopersicum* (H. Winkler) is discussed at length. Suggests that term *gigas* be reserved for sexually produced mutations. Low fertility, etc., of asexually produced tetraploid forms forbid their designation as true *gigas* mutations. Thorough investigation of the results of Mische on nuclear migration and of Winkler's graft hybrid brings the author to the conclusion that (1) cell and nuclear fusion do not occur in the graft callus, (2) adventitious buds do not originate in syndiploid cells and (3) doubling of the chromosome number is accidental.—Plate I shows the divergent types of chromosomes in the hitherto uninvestigated *Narcissus* root tips of the several species.—Paul A. Warren.

779. STOUT, A. B., AND HELENE M. BOAS. Statistical studies of flower number per head in *Cichorium intybus*: kinds of variability, heredity, and effects of selection. Mem. Torrey Bot. Club 17: 334-458. June 10, 1918.—Extended review of literature pertaining to number of flowers per head in Compositae. Statistical analysis of data on flower number in a large number of plants of perennial (and a race of annual) *Cichorium intybus* collected during four successive years throughout each entire season of bloom. Intraseasonal change in flower number (usually decrease from beginning to end of season) is influenced by length of blooming period, age of plant, and position of flower head on plant. Individual variability is considerable but races were isolated which, through four generations grown, showed characteristic differences in flower number and vegetative characters.—Helene Boas Yampolsky.

780. SWYNNERTON, C. F. M. Experiments and observations bearing on the explanation of form and colouring. 1908-1913. Jour. Linnean Soc. 33: 203-285. June 30, 1919.—Outlines general methods employed in connection with some 1600 experiments (taking into consideration those completed and in progress), at Chirinda, Africa, relative to selection and animal coloration on the basis of food preferences. Birds, with a few other animals (monkey, lizard, chameleon, a solpugid, and some insects) were utilized as subjects, their preferences for food, principally insects (particularly butterflies) being carefully noted.—Reports 228 detailed experiments with three captive birds, "European Rollers" (*Coracias garrulus* Linn.) (Picariæ), "A," "B," and "C," and tabulates preferred groups of insects (mostly) from highest grade (1) or most acceptable food, to lowest grade (32) or least acceptable food.—General conclusions are postponed until experiments in progress are finished.—The studies constitute evidence of decided value relative to mimicry and other problems of selection.—L. B. Walton.

781. TAMMES, TINE. [Rev. of: BRIDGES, CALVIN B. Nondisjunction as proof of the chromosome theory of heredity. Genetics 1: 1-52. 107-163. 9 fig. 1919.] Zeitschr. indukt. Abstamm. Vererb. 21: 124-125. July, 1919.

782. TAYLOR, NOEL. A case of hermaphroditism in a lizard. Proc. Zool. Soc. London 1918: 223-230. 3 fig. Mar., 1919.

783. TCHOUPROFF, AL. A. On the mathematical expectation of the moments of frequency distributions. Biometrika 12: 140-169, 185-210. 1919.—A study of moments of frequency distributions from standpoint of theory of probability. Idea of expectation of independent and dependent events is basis of general developments which are specialized to give well known results.—Use of probability gives explicit hypotheses and sharply defined terminology and symbolism, and thereby ensures accuracy of thought.—Rainard B. Robbins.

784. THOMPSON, J. ARTHUR. The new biology. Second part: Biochemistry and bio-physics. Livingness. Evolution. Scientia 26: 208-219. 1919.—Author is conservative as to interpretation of nature in terms of matter and energy. The sciences are progressing toward greater correlation rather than unity.—Difficulties in synthesis of living organism are increasing rather than diminishing. Criteria of life are still vague. There is need of studying la-

tent life.—There is also need of critical experiments concerning origin of inherited variations. Discrepancy between Lotsy's recent statement, "of heredity we know nothing," and Morgan's conclusion, "The problem of heredity may be said to be solved," results from different view points. Former had in mind complex potentialities of germ cell, the latter merely the method of character distribution. Author distinguishes between apparent failure of an organism to inherit individually acquired body characters and the possibility of inheriting individual experiences. Results of Castle's experiments with hooded rats and Illinois experiments on protein content of corn (maize) will eventually be better understood [prophecy fulfilled]. Evolution of selected and of selection processes go hand in hand.—*L. B. Walton.*

785. THOMPSON, W. P. **The inheritance of the length of the flowering and ripening periods in wheat.** *Proc. Trans. Roy. Soc. Canada* 3: 69–87. 1918.—Reports results of crosses between many pairs of wheat varieties differing by many degrees in regard to length of ripening and heading periods. Crosses were made between parents differing only slightly, also crosses involving greater parental differences. F_1 plants matured with late parent. F_2 plants formed regular curves of probability with variation from below mean of lower parent to above mean of higher parent. Sometimes parental extremes were exceeded. Interpreting results on basis of multiple-determiner hypothesis of blending, the sum of the differences between each successive pair of parents seems to be much greater than it should be on the evidence of direct crosses. Hypothesis, therefore, fails to explain satisfactorily the results as a whole though it may explain satisfactorily the results of each individual cross.—*E. A. Southee.*

786. THOMSON, J. ARTHUR. [French rev. of: DOWNING, E. R. **The third and fourth generation. An introduction to heredity.** *xi+164 p., 13 fig.* Univ. Chicago Press: Chicago, 1918.] *Scientia* 27: 72–74. Jan., 1920.

787. THOMSON, J. ARTHUR. [French rev. of: MORGAN, T. H., A. H. STURTEVANT, H. J. MULLER, AND C. B. BRIDGES. **The mechanism of Mendelian heredity.** *xii+262 p., 64 fig.* A. Constable & Co.: London. 1915.] *Scientia* 27: 74–75. Jan., 1920.

788. TISCHLER, G. **Untersuchungen über den anatomischen Bau der Staub- und Fruchtblätter bei *Lythrum Salicaria* mit Beziehung auf das Illegitimitätsproblem.** [Studies of the anatomical structure of the stamens and carpels in *Lythrum Salicaria* with reference to the problem of illegitimacy.] *Flora* 11, 12 (Festschrift Stahl): 162–192. 1918.—Haploid number of chromosomes of *Lythrum salicaria* is almost certainly 24, diploid 48. Chromosomes are unequal in size, which in different flowers is considered due to nutrition. Genotypical differences of heterostyled plants are not correlated with chromosome size. Nuclei of mature pollen grains of heterostyled individuals having same chromosome number are apparently of same size, consequently the cell contents differ very much in amount since the pollen of the smallest and medium-sized stamens is contrasted with that from the largest in size. Characteristic size variations of the cells of the heterostyled plants are also shown in ovules, ovarian tissue, and in stigmas. Müller's generally accepted statement that the stigmatic papillae show typical differences is not confirmed. Short-styled flowers have larger papillae than medium or long-styled. Relatively small number of measurements of stigmatic papillae from plants with different flower forms give a normal curve with no suggestion of three modes. The size of the stigmatic papillae and also the papillate epidermal cells of *Lythrum* vary with the nutrition, corresponding with the supply of water and other materials. A parallel exists between heterostyly and dioecism. Within the same families or even the same genera, as for example, *Lythraceae*, *Oxalidaceae*, *Rubiaceae*, *Caryophyllaceae*, *Primulaceae* and *Polygonadaceae*, heterostyly and cleistogamy occur together while heterostyly and dioecism are seldom found associated. A morphological adaptation of the pollen grains to particular styles or stigmas does not exist. Only to chemical agency can the partial but not absolute self-sterility of *Lythrum salicaria* be attributed. [See also Bot. Absts. 4, Entry 815].—*D. E. Jones.*

789. TISCHLER, G. **Analytische und experimentelle Studien zum Heterostylie-Problem bei *Primula*.** [Analytical and experimental studies on the problem of heterostyly in *Primula*.]

Festschrift zur Feier des 100-jährigen Bestehens der Kgl. Württ. Landwirtsch. Hochsch. Hohenheim. p. 254-273. 4 fig. April, 1918.—The size of the stigmatic papillae of *Primula* can be experimentally modified, being dependent upon nourishment. By early defoliation and subjecting the plants to darkness the flowers are greatly starved and the papillae correspondingly reduced so that the lengths of the hairs on long-styled flowers, with mature well developed stigmas up to the time of pollination, are brought below the normal for the short-styled forms. The latter are less influenced by this treatment. The modification of the stigmatic hairs or papillae is interpreted as osmomorphosis in the sense of Küster. The lack of nutrition, independently of the shortening of the papillae, may increase the distance from the stigma to the anthers in the long-styled form and decrease the distance in the short-styled form. The degree of heterostyly will therefore sometimes be greater and sometimes less, so that in extreme cases hemostyly is produced. Pollen grain size is not modified in the same way as the length of papillae. Even with great lack of nourishment part of the grains may have normal size. However, many abortive grains are shown, especially in *Primula sinensis*, as well as grains above normal size. The Darwinian and Lamarckian correlation between the amount of heterostyly and the development of the pollen and stigmatic papillae size can not be due therefore to genotypical differences, but is best looked upon as a coincidence arising from the morphological ecology. [See also Bot. Absts. 4, Entry 719.]-D. F. Jones.

790. TISCHLER, G. Das Heterostylie-Problem. [The problem of heterostyly.] Biol. Zentralbl. 38: 461-479. Nov., 1918.—Review of writer's previous publications (see Bot. Absts., two preceding entries, 788, 789) and of the work of others on heterostyly in various species, leading to the conclusion that the degree of this phenomenon is variable, due to the environmental factors and can not be put on a genotypical basis.—D. E. Jones.

791. TISCHLER, G. [Rev. of: ERNST, A. Bastardierung als Ursache der Apogamie im Pflanzenreich. Eine Hypothese zur experimentellen Vererbungs- und Abstammungslehre. (Hybridization as cause of apogamy in the plant kingdom. An hypothesis for experimental genetics and evolution.)] 666 p., 2 pl., 172 fig. Gustav Fischer: Jena, 1918.] Zeitschr. induct. Abstamm. Vererb. 21: 130-134. July, 1918.

792. TISCHLER, G. [German rev. of: ZIEGLER, H. E. Die Vererbungslehre in der Biologie und in der Soziologie. (Genetics in biology and sociology.) xvi+479 p., 8 partly colored pl., 114 fig. Gustav Fischer: Jena, 1918.] Zeitschr. induct. Abstamm. Vererb. 21: 192-199. Sept., 1919.

793. TJEBBES. [Rev. of: HERIBERT-NILSSON, N. Experimentelle Studien über Variabilität, Spaltung, Artbildung und Evolution in der Gattung *Salix*. (Experimental studies on variability, segregation, speciation and evolution in the genus *Salix*.) Lunds Univ. Arsskr. N. F. Afd. 2. 14 (No. 28): 1-145. 65 fig. 1918.] Genetica 1: 555-557. Nov., 1919.

794. TOWER, W. L. The mechanism of evolution in *Leptinotarsa*. Carnegie Inst. Washington Publ. 263. viii+384 p., 19 pl., 161 fig. 1918.—In architecture of germinal material author distinguishes two major kinds of agent, basal and definitive. Basal agents are properties of whole type and do not segregate. They are (a) basal factors, few in number, never altered and never interchanged, probably mixture of ground-substance colloids, and (b) chromatic receptors, substratum on which majority of determining agents are located (in nucleus). Definitive agents are (a) few, always associated with basal factors in cytoplasm, and (b) chromatic determiners, most numerous and commonly interchangeable in crossing. Experiments have demonstrated in *Leptinotarsa* 9 basal factors (haploid number of chromosomes is also 9), and in some cases 2 chromatic receptors for each basal factor. About 50 chromatic determiners have been discovered, many of them capable of fragmentation. Factors make several things possible, determiners decide which occur. Location of agents unknown, unlikely that observed phenomena are due to chromosome behavior. Reaction is chemical, rather than morphological. Whole germ cells is germ plasma, not some part of it. Eggs contain both factors and determiners, sperms only determiners. Female parent deter-

mines rate of growth, form, symmetry, etc., both parents determine details. In general, Mendelian principles govern.—Interspecific crosses give varying results. *L. signaticollis* × *L. diversa* give F_1 truly intermediate in all respects, and F_2 consisting of 1 *diversa* : 2 mid-type : 1 *signaticollis*. Total type remains as unit, no interchange occurs. These are results when rate of ontogenetic development (*Ac*) is same in both species. When *Ac* is made different for two species, by climatic changes, result of cross suggests that one parent is heterozygous, other homozygous; but apparent *signaticollis* type in F_1 is shown to be masked heterozygote, a fixed hybrid, breeding true. Group of determiners is bound together in firm association. These fixed hybrids, if discovered in nature, would have been regarded as new species (mutant).—*L. undecimlineata* × *L. signaticollis* exhibit three groups of characters (elytral pattern, larval pattern, lipoid color) which dissociate as groups. F_1 is uniform, and reciprocals are alike in adult, but maternal in larva. When *Ac* values are same, F_2 gives typical tri-hybrid results. With *Ac* conditions different, results are various. Under one set of conditions F_1 consisted of 1 *undecimlineata* : 2 mid-type : 1 *signaticollis*, each with different behavior in F_2 . Changing temperature further complicated results.—*L. decemlineata* ♀ × *L. diversa* ♂ gave F_1 and F_2 pure *decemlineata* in appearance but *diversa* in rate of growth and food preference.—*L. decemlineata* × *L. oblongata* gave F_1 in variety of combinations of parental characters, falling into three general classes, *decemlineata*, intermediate, and *oblongata*, each with different behavior in F_2 .—*L. decemlineata* × *L. multitaeniata* gave F_1 with *decemlineata* dominant (modifiable by external conditions) and F_2 on the whole of three types, *decemlineata*, heterozygotes, and *multitaeniata*.—Analysis of heterogeneity of certain pattern characters indicates that biotypes may be isolated. One biotype was observed to arise from another, perhaps due to change in environment. Attempts to accumulate quantitative differences have failed, but syntheses of characters have been readily possible. General population in several regions was analyzed and found to be different in each, but difference is not attributed to environment.—A. Franklin Shull.

795. TRATEUR, J. L. La nature de la télégonie. [The nature of telegony.] Réunion soc. belge biol. 1919: 883-884. 1919.

796. TUFTS, W. P. Almond pollination. California Sta. Bull. 306: 337-366. 15 fig. 1919.—Self-sterility and inter-fertility of commercial varieties affect choice of varieties and systems of planting. Even in interfertile varieties it is important to know commercial value of pollinizer, time of bloom, and amount and germinability of pollen of varieties used as pollinizers. Blooming periods and production of pollen in almond varieties are reported. Almond varieties are roughly divided into two classes: early and late bloomers. First blossoms in certain varieties each season may yield a smaller amount of pollen of inferior viability to that produced by flowers on same tree several days later. There is considerable variation in amount of pollen produced in different varieties. Satisfactory artificial germination was secured in 12 per cent cane sugar solution. All seventeen varieties thus far tested have proved self-sterile at least in certain years. Certain varieties are intersterile. A list of satisfactory pollinizers for important commercial varieties is given. Pollenizing agencies such as honey bees are necessary for a good crop. One colony of honey bees should be provided for each acre of orchard.—E. B. Babcock.

797. TUFTS, W. P. Pollination of the Bartlett pear. California Sta. Bull. 307: 369-390. 8 fig. 1919.—Experiments to determine whether Bartlett pears are benefited by cross-pollination. Production and viability of pollen of varieties used was determined in 12 per cent cane-sugar solution. Blooming period in Bartlett is longer than in other varieties tested. Bartlett is only partially self sterile in valleys and practically so in foothills. Author recommends interplanting of other varieties for cross-pollination. No cases of inter-sterility were found. Any variety with same flowering period may be used. Cross-pollinated Bartletts are less inclined to June drop than self-pollinated. As pollinating agents one colony of honey bees should be provided per acre of orchard.—J. L. Collins.

798. UDA, HAJIME. On the relations between blood color and cocoon color in silkworms, with special reference to Mendel's law of heredity. *Genetics* 4: 395-416. Sept., 1919.—New race of silkworm with yellow blood (and yellow silk glands) spins white silk. Ordinary races with yellow blood spin yellow silk; races with white blood spin white silk. A pure-bred yellow-blood, white silk \times pure white-blood, white silk, gives in F_1 all yellow-blood, yellow-silk, i.e., yellow blood is completely dominant over white, white silk disappears, replaced by yellow. $F_2 = 9$ yellow blood and yellow silk + 3 yellow blood, white silk + 4 white blood and white silk. Interaction between two genes occurs, C turning blood yellow, but by itself not affecting silk, and Y which affects visibly neither blood nor silk unless combined with C , when it makes silk yellow. Abundant evidence from F_3 and back crosses with both pure parent breeds sustains this interpretation.—Pure white-blood white-silk strains differ in $re\ Y$, being demonstrably $ccYY$, $ccYy$, or $ccyy$. Tested by mating with $CCYy$ (i.e., F_1 ex yellow blood, yellow silk \times yellow blood, white silk), $ccYY$ uniformly threw all yellow blood and yellow silk, $ccyy$ uniformly threw 50 per cent yellow blood and yellow silk, 50 per cent yellow blood, white silk. For 6 generations of white these tests were repeated, neither strain showing any tendency toward $ccYy$, which by same test threw 3 yellow blood and yellow silk: 1 yellow blood, white silk.—J. H. Gerould.

799. VAN HERWERDEN, M. A. [Rev. of: CONKLIN, EDWIN G. Heredity and environment in the development of men. 2nd ed., 550 p. Princeton Univ. Press: Princeton, 1918.] *Genetica* 1: 553-554. Nov., 1919.

800. VAN HERWERDEN, M. A. [Dutch rev. of: GUYER, M. F., AND E. A. SMITH. Studies on cytolysins. I. Some prenatal effects on lens antibodies. *Jour. Exp. Zool.* 26: 65-82. 1918.] *Genetica* 2: 60-61. Jan., 1920.

801. VAN HERWERDEN, M. A. [Dutch rev. of: KUTTNER, OLGA. Untersuchungen über Fortpflanzungsverhältnisse und Vererbung bei Cladoceren. (Studies on reproductive relations and heredity in Cladocera. Inaug.-Diss. Freiburg. 1909; *Internation. Rev. d. gesamm. Hydrobiol.* 2: 1909.—BANTA, A. M. Sex and sex-intergrades in Cladocera. *Proc. Nation. Acad. Sci. [U. S.]* 4: 373. 1918.] *Genetica* 2: 68-69. Jan., 1920.

802. VON GRAEVENITZ. [German rev. of: GATES, R. R. On the origin and behavior of *Oenothera rubricalyx*. *Jour. Genetics* 4: 353-360. 1915.] *Zeitschr. induct. Abstamm. Vererb.* 21: 191. Sept., 1919.

803. VON GRAEVENITZ. [Rev. of: SAUNDERS, EDITH R. On the occurrence, behavior and origin of a smooth-stemmed form of the common foxglove (*Digitalis purpurea*). *Jour. Genetics* 7: 215-228. 1918.] *Zeitschr. induct. Abstamm. Vererb.* 21: 187-188. Sept., 1919.

804. VON GRAEVENITZ. [German rev. of: SAUNDERS, EDITH R. Studies in the inheritance of doubleness in flowers. II. *Meconopsis*, *Althaea*, and *Dianthus*. *Jour. Genetics* 6: 165-184. 1917.] *Zeitschr. induct. Abstamm. Vererb.* 21: 188-189. Sept., 1919.

805. VON GRAEVENITZ. [German rev. of: SUTTON, IDA. Report on tests of self-sterility in plums, cherries and apples at the John Innes Horticultural Institution. *Jour. Genetics* 7: 281-300. 3 fig. Aug., 1918. (See *Bot. Absts.* 1, Entry 945.)] *Zeitschr. induct. Abstamm. Vererb.* 21: 191-192. Sept., 1919.

806. VON SEELHORST, C. Transmission of characters. *Jour. Landw.* 66: 141-162. 1918.

807. VON TSCHERMAK, E. Steigerung der Ertragsfähigkeit der Tomaten durch Bastardierung in der ersten Generation. [Increase of productivity of tomatoes through hybridization in the first generation.] *Nachr. Deutsch. Landwirtschaftsgesell. Österreich* 1918: 425-426. 1918.

808. VON UBISCH, G. [Rev. of: BACKHOUSE, W. O. Note on the inheritance of "crossibility." Jour. Genetics 6: 91-94. 1916.] Zeitschr. indukt. Abstamm. Vererb. 21: 142. July, 1919.
809. VON UBISCH, G. [German rev. of BACKHOUSE, W. O. The inheritance of glume length in *Triticum polonicum*. A case of zygotic inhibition. Jour. Genetics 7: 125-133. Feb., 1918. (See Bot. Absts. 1, Entry 211.)] Zeitschr. indukt. Abstamm. Vererb. 21: 190-191. Sept., 1919.
810. VON UBISCH, G. [Rev. of: CAPORN, A. ST. CLAIR. The inheritance of tight and loose paleae in *Avena nuda* crosses. Jour. Genetics 7: 229-246. 1918. (See Bot. Absts. 1, Entry 866.)] Zeitschr. indukt. Abstamm. Vererb. 21: 143. July, 1919.
811. VON UBISCH, G. [Rev. of: CAPORN, A. ST. CLAIR. An account of an experiment to determine the heredity of early ripening in an oat cross. Jour. Genetics 7: 247-257. 1918. (See Bot. Absts. 1, Entry 867.)] Zeitschr. indukt. Abstamm. Vererb. 21: 129-130. July, 1919.
812. VON UBISCH, G. [Rev. of: CAPORN, A. ST. CLAIR. On a case of permanent variation in the glume length of extracted types and the inheritance of purple colour in the cross *Triticum polonicum* × *Tr. Eloboni*. Jour. Genetics 7: 259-280. 1918. (See Bot. Absts. 1, Entry 868.)] Zeitschr. indukt. Abstamm. Vererb. 21: 143-144. July, 1919.
813. VON UBISCH, G. [Rev. of: EMERSON, R. A. The calculation of linkage intensities. Amer. Nat. 50: 1411-1420. 1916.] Zeitschr. indukt. Abstamm. Vererb. 21: 125-129. July, 1919.
814. VON UBISCH, G. [Rev. of: RIEBESELL, P. Die mathematischen Grundlagen der Variations- und Vererbungslehre. (The mathematical principles of variation and heredity.) Math. Bibliothek 24: 1916.] Zeitschr. indukt. Abstamm. Vererb. 21: 119. July, 1919.
815. VON UBISCH, G. [Rev. of: TISCHLER, G. (1) Untersuchungen über den anatomischen Bau der Staub- und Fruchtblätter bei *Lythrum Salicaria*, mit Beziehung auf das Illegitimitätsproblem, (Studies of the anatomical structure of the stamens and carpels in *Lythrum Salicaria*, with reference to the problem of illegitimacy.) Flora 11, 12: (Festschrift Stahl): 162-192. 1918. IBID. (2) Analytische und experimentelle Studien zum Heterostylie-Problem bei *Primula*. (Analytical and experimental studies on the problem of heterostyly in *Primula*.) Festschr. z. Feier des 100-jährigen Bestehens d. kgl. württ. landw. Hochschule Hohenheim. 254-273 p., 4 fig. April, 1918. IBID. (3) Das Heterostylie-Problem. (The problem of heterostyly.) Biol. Zentralbl. 38: 461-479. Nov., 1918. (See Bot. Absts. 4, Entries 719, 788, 789, 790.)] Zeitschr. indukt. Abstamm. Vererb. 21: 247-248. Nov., 1919.
816. VON UBISCH, G. [Rev. of: TROW, A. H. On the number of nodes and their distribution along the main axis in *Senecio vulgaris* and its segregates. Jour. Genetics 6: 1-63. 1916.] Zeitschr. indukt. Abstamm. Vererb. 21: 142-143. July, 1919.
817. VON UBISCH, G. [German rev. of: TROW, A. H. On "albinism" in *Senecio vulgaris* L. Jour. Genetics 6: 65-74. 1916.] Zeitschr. indukt. Abstamm. Vererb. 21: 189-190. Sept., 1919.
818. WALTHER. [Rev. of: LLOYD-JONES, ORREN, AND JOHN M. EVVARD. Inheritance of color and horns in blue-gray cattle. Agric. Exp. Sta. Iowa College Agric. Res. Bull. 30: 67-106. 10 fig. 1916.] Zeitschr. indukt. Abstamm. Vererb. 21: 121-122. July, 1919.
819. WELLS, R. W. (Floral proliferation in *Allium mutabile*.) Plant World 22: 351-352. 1919.—Notes the development of flowers from staminal primordia.—J. Arthur Harris.

820. WESTPHAL, A. Über familiäre Myoklonia und über Beziehungen derselben zur Dystrophia adiposo-genitalis. [On familial myoclonia and on its relation to dystrophia adiposogenitalis.] Deutsch. Zeitschr. Nerven. 58: 1918.

821. WIGGANS, C. C. Some factors favoring or opposing fruitfulness in apples. Missouri Agric. Exp. Sta. Res. Bull. 32: 1-60. 6 fig. 1918.

822. WITTE, HERNFRID. Själfbefrukningens inverkan på afkommans utveckling hos timotejen. [Effect of inbreeding on the development of progeny in timothy.] Sver. Utsädesf. Tidskr. 29: 86-90. 1919.—Timothy is usually cross-pollinated. When individual plants or heads are isolated only a very few seeds are formed, showing partial self sterility. The progeny from selfed seed when compared with their vegetatively propagated parent plant showed an average decrease of 15 to 35 per cent in height and 20 to 65 per cent in dry weight. Only rarely did any progeny plant equal its parent in vigor. Open-pollinated progeny showed no significant deviation from the parent.—*E. G. Anderson.*

823. WITTE, HERNFRID. Breeding timothy at Svalöf. Jour. Heredity 10: 291-299. 1 pl., 5 fig. Oct., 1919.—The author states the extent of meadow culture in Sweden and gives a brief description of his theory and methods of breeding timothy. There follows a brief discussion of the variation and heredity of certain characters as: length of stem, number and length of internodes, thickness of stem, direction of stem, size and color of leaves, form and size of head, variations of flower parts, physiological characters, aftergrowth and disease resistance. There is evidence that these characters are heritable but pure-line selection or breeding is not attempted due to the fact that timothy is open-pollinated. Clonal propagation, individual and mass selections are practised. Practical results show 12 and 20 per cent increase in yield, respectively, of Primus and Gloria timothy in comparative tests with ordinary Swedish timothy. Above varieties are resistant to rust and are high yielders of seed.—*Maxwell J. Dorsey.*

824. WOODS, F. A. Racial origins and honors of war. Jour. Heredity 10: 332. 1919.—An analysis of the relation between line of descent and valor in war as indicated by the names of those soldiers who won distinguished service medals in the 26th Division.—*Maxwell J. Dorsey.*

825. WOODWORTH, C. M. The application of the principles of breeding to drug plants, particularly *Datura*. Bull. Univ. Wisconsin 1005. 32 p., 15 fig. Nov., 1919.—Bulletin was prepared with the feeling that modern principles of breeding should be more generally applied to drug plants with a view to their improvement. Technique of crossing is described and a scheme for improvement in alkaloid content suggested.—*A. F. Blakeslee.*

826. WRIEDT, CHR. Über die Vererbung von Ohrenlänge beim Schafe. [On the inheritance of ear length in sheep.] Zeitschr. indukt. Abstamm. Vererb. 20: 262-263. Feb., 1919.—Short-eared forms occur among ancient types in many regions of Norway, but have very nearly disappeared because of the wide use of Cheviot rams. Author crossed short-eared ewe to Oxford ram, obtaining a short-eared lamb. Author has additional records on 3 short-eared sheep in a flock of 10, and found long-eared types never gave short-eared. Concluded that short-eared type is a Mendelian dominant. Results agree with those of Rietzman. However, a recent record on an earless type seems to indicate that short-eared are heterozygotes, for short-eared \times short-eared gave 1 long-eared + 5 short-eared + 1 earless.—*J. A. Dellefsen.*

827. YAMPOLSKY, CECIL. Inheritance of sex in *Mercurialis annua*. Amer. Jour. Botany 6: 410-442. Pl. 37-40, fig. 1. 1919.—Author secured both female and male plants of *Mercurialis annua*. The female plants bore a few male flowers the pollen of which was used to fertilize the female flowers and thus procure seeds from the female plant. Some of the male plants produced a few female flowers which were pollinated with pollen from the male plant and a few seeds thus obtained from the male plants. All seedlings from female plants were prevaillingly females; these in turn produced female plants in the next generation when pollinated from the few male flowers which developed upon the plant; similar results were obtained in

the third and fourth generation. All of the seedlings obtained from the male plants were pre-
vailingly male, only a few developing a few female flowers. The same results were obtained
in the second generation in the male plants. Observations on this species show plants which
produce only female flowers, others which produce only male flowers, and others which show
gradations between pure femaleness and pure maleness. A rather extensive review of the lit-
erature on inheritance in sex, especially in plants, is given, and the general conclusion reached
that the sex of the plant is not determined by the production of two kinds of eggs which are
distinctly male-producing or female-producing or by two kinds of pollen grains, as believed
by Bateson and Correns, but that there are gametes of "graded potencies," some prevailingly
or exclusively male-producing, others prevailingly or exclusively female-producing, others
more strictly monoecius-producing.—*Chester A. Darling.*

828. ZELNY, CHARLES. The mutational series, full to bar to ultra bar, in *Drosophila*.
Anat. Rec. 17: 336. Jan. 20, 1920.—[Author's abstract of paper read before American Society
of Zoologists, St. Louis, December 30, 1919.]—Ultra-bar appeared in a single male in the sec-
ond generation of downward selection in white bar on November 20, 1917. The stock estab-
lished from it averaged 23 facets in the males as opposed to 75.6 facets in the bar stock from
which it was derived and 849.8 facets in full eye. It has remained constant since that time
except for the appearance of a few additional mutations. The interest in this mutant lies in
the following facts. It is not due to an accessory factor, but is a change in the bar gene itself.
The changed gene produces a somatic effect which is an intensification of that produced by
bar. This effect is in the direction of selection. The dominance is greatly increased. Ultra-
bar and the various other races of bar furnish unusual material for a quantitative study of
both germinal and environmental factors.—*Charles Zeleny.*

829. ZELNY, CHARLES. The tabulation of factorial values for eye-facet number in the
bar races of *Drosophila*. *Anat. Rec.* 17: 337-338. Jan. 20, 1920.—[Author's abstract of paper
read before American Society of Zoologists, St. Louis, December 30, 1919.]—In working up the
data obtained in a study of the germinal and environmental factors affecting eye-facet number
in the bar races of *Drosophila*, it became evident that the demands of biological analysis were
not adequately met by the system of arrangement in classes with equal facet numbers. It
has been shown by Krafka that the effect of temperature upon the mean facet value of a stock
is approximately proportional to the mean value of that stock. A change of one degree in
temperature in a 200-facet stock produces ten times as much change in facet value as it does
in a 20-facet stock. The probability that other factors affecting facet number may act in a
similar way is discussed, and the conclusion is reached that a tabulation in classes with equal
facet numbers does not give as close an approximation to true factorial values as a tabulation
in which the range of each class is equal to a definite fixed per cent of the mean facet value of
its class. In the latter case the classes may be taken to represent equal factorial values
though the facet ranges are unequal. The variation constants can then be put directly in
factorial units. Such a scheme is especially valuable in the graphic representation of selec-
tion data in which the mean of the unselected stock is taken as the point of departure, and any
facet value can be represented as plus or minus a certain number of factorial units from the
mean of the unselected stock.—*Charles Zeleny.*

830. ZELNY, CHARLES. Forty-two generations of selection for high- and low-facet num-
ber in the white bar-eyed race of *Drosophila*. *Anat. Rec.* 17: 338-339. Jan. 20, 1920.—[Au-
thor's abstract of paper read before American Society of Zoologists, St. Louis, December 30,
1919.]—Following the discovery of the pronounced effect of temperature upon eye-facet num-
ber in *Drosophila*, a careful control of that factor has made possible a better analysis of the
results of selection than that obtained in the earlier work of Zeleny and Mattoon, May and
Zeleny. The present paper deals with forty-two generations of selection in a white-bar race.
With accurate temperature control it is possible to isolate the occasional mutants as they
arise and to demonstrate that if they are not included in the series, selection ceases to be effec-
tive after three to five generations. Crosses between the high and low lines confirm the

results of previous selections and show that the difference between high and low is in large part, if not wholly, due to accessory factors outside of the sex chromosome in which the bar gene is located. There is no evidence that variability of the bar gene is a factor in this effect, which is purely a matter of the sorting of differences existing in the stock at the beginning of selection. There is, however, no limit to the possibilities of selection if the occasional mutants are included in the series, and two at least of these, reversal to full and ultrabar, have been shown to changes in the bar gene itself.—*Charles Zeleny*.

831. ZINN, JACOB. On variation in Tartary buckwheat, *Fagopyrum tataricum* (L.) Gaertn. Proc. Nation. Acad. Sci. U. S. Amer. 5: 506-514. Nov., 1919.—Normally 50 per cent or more of this race have 3 carpels. Unusual conditions (high humidity and temperature) shift the mode (67 per cent) to 4 (abnormal), range 3 to 25. Abnormal perigones, up to 18 parts, are distinctly correlated with above. Race comes from single abnormal individual, and behaves in inheritance as eversporting variety, selection of abnormal extremes being ineffective. Abnormalities are most frequently at certain nodes. Full account to be published in Genetics.—*Merle C. Coulter*.

HORTICULTURE

J. H. GOURLEY, *Editor*

FLORICULTURE AND ORNAMENTAL HORTICULTURE

832. AHMED BIN HAJI OMAR. Races of the coconut palm. Gardens' Bull. Straits Settlements 2: 143. 3 pl. 1919.—Fourteen varieties of Singapore coconuts are briefly characterized; photographic plates show the end view, side view, and cross section of the nut of each.—*S. F. Trelease*.

833. ANONYMOUS. A new and promising rose. [Rev. of: VAN FLEET, DR. W. New pillar rose. Jour. Heredity 10: 136-138. 2 fig. 1919.] Florists' Exchange 47: 1161. 1919.—Parentage, description and habits given of a new rose seedling which gives much promise among the hardy pillar or low climbing sorts. He includes among its ancestors the new Chinese *Rosa Soulieana*, *R. setigera*, *R. Wichuraiana* and a Tea Rose.—*L. A. Minns*.

834. ANONYMOUS. A substitute for glass. Nation. Nurseryman 27: 315. 1919.—A substitute for glass to be used in greenhouse work is reported to be on the market in England. It is composed of water and white gelatinous substance worked on to a pliable but strong foundation of fine wire or fabric netting. The weight is only a fraction of that of glass and breakage is reduced to almost nothing. Transmission of light is only slightly less than with glass and it promises to be an economical substitute for the latter.—*J. H. Gourley*.

835. ANONYMOUS. *Celastrus obiculatus*. Nation. Nurseryman 27: 289. 1919. 1 fig.—The Japanese bittersweet (*Celastrus obiculatus*) can be trained into "standard" form and is recommended for garden planting as more showy than our native species.—*W. N. Clute*.

836. ANONYMOUS. *Chionanthus Virginica*. Nation. Nurseryman 27: 185, 186. 1 fig. 1919.—The staminate form of the fringe tree (*Chionanthus Virginica*) is the showiest, but the blue-black fruit of the pistillate plant is an added decorative feature and the fruit is much relished by birds. The species is hardy as far north as Massachusetts and Northern Illinois but may be injured in severe winters.—*W. N. Clute*.

837. ANONYMOUS. *Halesia tetraptera*, var. *monticola*. Nation. Nurseryman 27: 292. 1919.—The form of *Halesia tetraptera* growing in elevated parts of the Southern States has been distinguished from the lowland form as var. *monticola*. The leaves are less hairy, the flowers a third larger and the fruit twice as large. The variety grows in tree form often 80 feet high and is recommended for street planting.—*W. N. Clute*.

838. ANONYMOUS. **New rose, Frank W. Dunlop.** Florists' Exchange 47: 900. *Fig. 1.* 1919.—Originated by JOHN H. DUNLOP, Toronto, Canada. Parentage and distributors in U. S. A. given.—*L. A. Minns.*

839. ANONYMOUS. **New seedling rose, Mrs. John Cook.** Florists' Exchange 47: 493. *Fig. 1.* 1919.—Parentage, description and originator given.—*L. A. Minns.*

840. ANONYMOUS. **RAFFIA.** Nation. Nurseryman 27: 13. 1919.—An article is quoted from the Australian International Nurseryman by E. E. PRESCOTT on the source of raffia (*raphis raffia*). The palms from which it is obtained grow in profusion in Madagascar, and are described as magnificent and gigantic, the leaves often measuring 60 feet in length and 30 to 40 feet in width. They are not of use economically until their seventh year, and they die shortly after their twentieth year when they flower. Its use at the "front" as a material for camouflage purposes is described.—*J. H. Gourley.*

841. ANONYMOUS. **Rose Mme. Butterfly.** Florists' Exchange 47: 597. *Fig. 1.* 1919.—Parentage, description and originator given.—*L. A. Minns.*

842. ANONYMOUS. **Rose Premier.** Florists' Exchange 47: 547. *Fig. 1.* 1919.—Parentage, description, good qualities and originator given.—*L. A. Minns.*

843. ANONYMOUS. **Sobarias.** Nation. Nurseryman 27: 65, 66. *1 fig.* 1919.—The Sobarias are usually listed by nurserymen as spiraeas. The commonest species in cultivation is *S. sorbifolia*. *S. arborea* is illustrated. The first mentioned blooms earliest followed by *S. stellipilla*, *S. asurgens*, and *S. arborea*. *S. Aitchinsonii* blooms in September.—*W. N. Clute.*

844. ANONYMOUS. **List of seeds of hardy herbaceous plants and of trees and shrubs.** Kew Bull. Misc. Inf. [London] 1919: Appendix 1-23. 1919.—This is a list of seeds, matured at Kew during 1918, and available for exchange.—*E. M. Wilcox.*

845. ANONYMOUS. **The dahlia.** Missouri Bot. Gard. Bull. 7: 41-46. *Pl. 12-13.* 1919.—The history, varietal classification, and culture of dahlias. Forty-nine varieties are listed that were grown in the St. Louis gardens in 1918, with descriptive characters.—*O. T. Wilson.*

846. ANONYMOUS. **Agricultural possibilities of the Sahara.** Sci. Amer. Supple. 87: 297. 1919.

847. ANONYMOUS. **Notizie varie.** [Various notices.] Bull. R. Soc. Toscana Orticult. 4: 67-68. 1919.—Notes concerning: varieties of *Nymphaea*, "*Veronica Traversi*," "*Amygdalopersica Formonti*," and the color of roses.—*W. H. Chandler.*

848. ANONYMOUS. **The castor bean and its many uses.** Sci. Amer. 120: 528, 530. 1919.

849. ARNOLD, GEO. **Forget-me-nots naturalized.** Florists' Exchange 47: 495. *Fig. 1.* 1919.—The author reports places (near Rochester, N. Y.) where biennial forget-me-nots, probably *Myosotis alpestris* of the catalogs, have become naturalized to a considerable extent on uncultivated and unmown soil. Very favorable growth is made in shade of trees. The soil is gravelly loam, and not especially moist, but the air is unusually moist as the place is surrounded by a lake, deep glens and wooded hills.—*L. A. Minns.*

850. BAXTER, SAMUEL NEWMAN. **Pagoda tree of Japan.** Nation. Nurseryman. 27: 97, 98. *2 fig.* 1919.—*Sophora Japonica* has the habit of blooming in midsummer making it a desirable tree for planting. The largest specimen in the vicinity of Philadelphia grows on the Buist estate and measures three feet in diameter at the base with a spread of 70 feet. The ground surrounding this tree has been set aside as a park in order to preserve it.—*W. N. Clute.*

851. BOYNTON, KENNETH R. *Arctotis grandis*. *Addisonia* 4: 45, 46. *Pl. 143 (colored)*. 1919.—A south African species with strikingly colored flowers, frequent in American flower gardens.—*T. J. Fitzpatrick*.

852. BOYNTON, KENNETH R. *Centaurea montana*. *Addisonia* 4: 57. *Pl. 149 (colored)*. 1919.—Describes and figures this common flower garden perennial, a native of Europe.—*T. J. Fitzpatrick*.

853. CROPP, CARL. Flower seed growing in America. *Seed World* 6: 20-21. 1919.

854. FULTZ, F. M. The lilies of the field. Beautiful and striking wild lilies of California's fields. *Sci. Amer. Supplem.* 88: 92-94, 96. *17 fig.* 1919.

855. GRIFFITHS, DAVID. Domestic production of Easter lily bulbs. *Florists' Exchange* 47: 443, 468. 1919.—The author reports on investigations in growing Easter lilies from seed now being conducted by the United States Department of Agriculture in its greenhouses at Arlington Farm, near Washington. The group of lilies included seedlings of 1916, and subsequent years, some of which had been forced in 1918 and then produced a crop of seed; plants of the Creole lily of the South; and a few seedlings of Easter lily produced with *L. candidum* pollen. Attention is called to the desirability of growers having facilities to start seedling generations of Easter lilies for future use, as in two years 60 per cent of the seedlings can be forced into bloom for the Easter trade. [See also next following Entry, 856.]—*L. A. Minns*.

856. GRIFFITHS, DAVID. Easter lily bulb production. *Florists' Exchange* 48: 775. *1 fig.* 1919.—It is possible for the florist to produce his own bulbs of Easter lily from seed in one year's time at a minimum expense. These stocks are hardy under proper treatment as far north as Washington and consequently can be produced out of doors, can be grown on from year to year as a permanent out-of-door crop, and can be set out to finish off after the season of bloom has passed if the stems are not cut too short. Those bulbs from which flowers with a minimum of stem have been cut will recuperate perfectly with one year of outdoor culture while those cut at the surface of the pots behave peculiarly. The proper method of handling them is under investigation. It is not necessary to carry seedlings in pots through their first flowering. Last winter the seed was sown in flats the 15th day of January, 9000 seedlings pricked into thumb pots in March, the plants set in the field the first of May. The first blossoms appeared in late July and as late as October 22 were continuing in blossom. Some of the plants had as high as eight flowers to the stem. These will make good forcing stock for next fall's use. Five per cent of them are large enough to force. From seedlings brought to forcing size—which may be said to take two years under outdoor conditions although it is said that it takes 3 years from bulblets in Japan—it is a simple matter to increase one's stock. Under conditions at Washington in two years from seed they are able to count on natural reproduction of from 3 to 4 stem bulblets, 5 to 7 cm. in circumference. When well handled these will produce good forcing bulbs which will give from 3 to 5 flowers after one year of outdoor culture. In 2 years' outdoors they will make bulbs 7 to 9 inches in circumference, which is as large, if not larger, than it is profitable to force. [See also next preceding Entry, 855.]—*L. A. Minns*.

857. JUDD, WM. H. Ornamental trees and shrubs of merit for New England. *Nation. Nurseryman* 27: 80-81, 110-111. 1919.

858. LANDINI, L. L'impianto dei giardini lungo la spiaggia meridional Adriatica. [The planting of the gardens along the meridional coast of the Adriatic.] *Bull. R. Soc. Toscana Orticolt.* 4: 64-66. 1919.—Practical directions as to the best varieties of plants for gardens along the meridional coast of the Adriatic.—*W. H. Chandler*.

859. MATTHEWS, EDWIN. Shade loving plants. *Florists' Exchange* 47: 203. *Fig. 2.* 1919.—The author answers the vexed question of what to plant and have do well in the shade by listing shrubs under two groups as (1) those which do well in shade and (2) those which

thrive in shade indifferently. Various shady locations such as under surface-rooting trees, deep-rooting trees and dense-shading trees, and close to over-hanging eaves of houses are discussed.—*L. A. Minns*.

860. MIYOSHI, MANABU. Über der Erhaltung einer neuen wildwachsenden hängenden Varietät des Kastanienbaumes als Naturdenkmal [Concerning a new wild chestnut with weeping branches and its preservation as a Natural Monument]. *Bot. Mag. Tokyo* 33: 185-188. 1 fig. Sept., 1919.—See *Bot. Absts.* 4, Entry 452.

861. MONDINO, ALFONSINO. Ricerche anatomiche e morfologiche sulla var. "tuberosa" Asch. dell "*Arrhenatherum elatius*" M. K. nuovamente trovata in Piemonte. [Anatomical and morphological research of var. *tuberosa* Asch., of *Arrhenatherum elatius*, M. K. recently found in Piedmont.] *Atti. R. Accad. Sci. Torino* 54: 782-794. 1919.—See *Bot. Absts.* 4, Entry 988.

862. NASH, GEORGE V. *Crataegus spathulata*. *Addisonia* 4: 47. *Pl.* 144 (colored). 1919.—Includes description, with notes on distribution, habitat, time of flowering, etc. This species of hawthorn is native of the southeastern United States. It was discovered by Michaux in South Carolina and characterized by him in his classic work. This shrub was early introduced into English and French gardens.—*T. J. Fitzpatrick*.

863. NASH, GEORGE V. *Hamamelis virginiana*. *Addisonia* 4: 43, 44. *Pl.* 142 (colored). 1919.—Describes with notes this late fall flowering shrub or small tree, native of eastern North America.—*T. J. Fitzpatrick*.

864. NASH, GEORGE V. *Orontium aquaticum*. *Addisonia* 4: 51, 52. *Pl.* 146 (colored). 1919.—A species of a monotypic genus, ranging from Massachusetts to Florida and Louisiana, inhabiting swamps, ponds, and rivers, usually not distant from the seashore.—*T. J. Fitzpatrick*.

865. NASH, GEORGE V. *Paphiopedilum rothschildianum*. *Addisonia* 4: 41, 42. *Pl.* 141 (colored). 1919.—Gives a full description with comment of this showy perennial orchid formerly included in the genus *Cypripedium*. It is a native of the humid forests of Borneo Sumatra, and New Guinea and was introduced into cultivation in 1887. Short statements concerning related genera are given.—*T. J. Fitzpatrick*.

866. NASH, GEORGE V. *Viburnum lantana*. *Addisonia* 4: 55, 56. *Pl.* 148 (colored). 1919.—Gives a description of the species with comment and contrast of related species. This ornamental shrub is a native of Europe, the Caucasus, and northern Africa. It responds readily to cultivation as do most of the species of the genus, giving us many of our very attractive ornamental shrubs.—*T. J. Fitzpatrick*.

867. PACK, C. L. Central Park trees starving to death. *Amer. Forest.* 25: 1391-1400. 30 fig. 1919.—See *Bot. Absts.* 4, Entry 455.

868. PAMMEL, L. H. Effect of winter on shrubs at Ames, Iowa. *Rep. Iowa State Hortic. Soc.* 53: 39-41. 1918.—The author gives a list of plants injured by cold during the winter of 1917-1918. Mention is made of the injury to Concord grape, in some places it killed to the ground. There was also serious injury to osage orange *Toxylon pomiferum*, *Liriodendron Tulipifera*, and *Sambucus racemosa*. Slight injury was noted to *Philadelphus coronarius* and *Ulmus campestris*. Many conifers like *Abies concolor*, *A. balsamea* and *Thuja occidentalis* suffered much in some places. Plants in a soil saturated with moisture are less injured than when the soil is comparatively dry. Covering of snow helps to protect plants. Such plants as *Rubus strigosus* and *Sambucus racemosa* frequently suffer at Ames, although perfectly hardy in Minnesota, with a greater covering of snow.—*L. H. Pammel*.

869. PAYNE, THEODORE. The California wild flower garden in Exposition Park, its history and objects. Bull Southern California Acad. Sci. 18: 55-77. 1919.—The object and history of the wild flower garden in Exposition Park, San Diego, California is given by its originator with a list of the species growing therein.—*Roxana S. Ferris*.

870. PENNELL, FRANCIS W. *Alonsoa meridionalis*. Addisonia 4: 59, 60. Pl. 150 (colored). 1919.—Gives a full description of this interesting plant of the Figwort family, a native of the Andes of Columbia, where it appears as a weed.—*T. J. Fitzpatrick*.

871. PENNELL, FRANCIS W. *Penstemon hirsutus*. Addisonia 4: 49, 50. Pl. 145 (colored). 1919.—Gives full description of this delicate-flowered beard-tongue, contrasting it with *P. digitalis*. It is a native of northern United States and readily responds to cultivation.—*T. J. Fitzpatrick*.

872. ROSE, J. N. *Echinopsis leucantha*. Addisonia 4: 53. Pl. 147 (colored). 1919.—A variable species of cactus, of wide distribution in Argentina. It does well in cultivation, freely flowering each spring.—*T. J. Fitzpatrick*.

873. SECKER, A. H. A new yellow fruited Jerusalem cherry. Florists' Exchange 47: 285. Fig. 1. 1919.—This new Jerusalem cherry, a hybrid of *Clevelandii*, made its appearance at the establishment of J. B. Keller Sons, Rochester, N. Y., 3 years ago. The fruit is from lemon to dark orange in color, in striking contrast to its red-fruited parent.—*L. A. Minns*.

874. SHAW, J. AUSTIN. Fischer's new white freesia. Florists' Exchange 47: 671. 1919.—Originated by RUDOLPH FISCHER, San Gabriel, Calif., through selection; similar to *Freesia Purity*, but improved. Description given and introducer named.—*L. A. Minns*.

875. SMITH, J. J. Index Orchidacearum quae anno 1919 in Horto Botanico Bogoriensi coluntur. [Index of orchids grown during the year 1919 in the Buitenzorg Botanical Garden.] Bull. Jard. Bot. Buitenzorg III, 1: 91-126. 1919.—The list contains over 1000 species, varieties and forms not included.—*J. J. Smith*.

876. TOOLE, WILLIAM SR. Domesticating our native wild flowers. Wisconsin Hortic. 9: 89-91. 1919.—Experiences in transplanting Wisconsin wild flowers are described and the view is expressed that many species thrive better under cultivation than in their native habitat.—*G. F. Potter*.

877. WALDRON, C. B. Factors in hardiness. Rept. Iowa State Hortic. Soc. 53: 115-119. 1918.—See Bot. Absts. 4, Entry 1593.

878. WALDRON, RALPH AUGUSTUS. The peanut (*Arachis hypogaea*) its history, histology, physiology, and utility. Contrib. Univ. Pennsylvania Bot. Lab. 4: 301-333. Pl. 79-80. 1919.—See Bot. Absts. 4, Entry 139.

879. WHITE, E. A. *Lilium longiflorum* from seed. Florists' Exchange 48: 53. 5 fig. 1919.—An account of work done in the Dept. of Floriculture, Cornell University, on raising seedling lilies, confirming experiments by the Dept. of Agric., Washington, D. C. Vigorous plants in full bloom were produced in a little over eighteen months after seed sowing. Healthy seedlings do not result from self-fertilization. As a rule the strongest seedlings are obtained by crosses between varieties within the species, as, for example, *Lilium longiflorum* var. *formosum* x *formosum*, and var. *eximium* x var. *formosum*. Other experiments seemed to prove that hybridization between garden species may be successful. The seedlings have not yet flowered and are still under observation.—*L. A. Minns*.

FRUITS AND GENERAL HORTICULTURE

880. ACKERMAN, A. J. Two leafhoppers injurious to apple nursery stock. U. S. Dept. Agric. Bull. 805. 35 p. Pl. 1-5. 1919.—Two distinct kinds of injury to apple nursery stock were observed by the author while working at West Chester, Pa. Investigations reported are for work carried on at this place and in Western Maryland. Two species of leaf hoppers, namely *Empoasca mali* and *Empoa rosae* cause the injury. Complete history, range of distribution, food habits, life history, character of injury, natural enemies and remedial measures for each are reported. Data on successful spraying experiments using 40 per cent nicotine sulfate of varying strength with and without fishoil soap (2 to 50) are also given. A list of publications on both species of leafhoppers is appended.—E. V. Hardenburg.

881. ALDERMAN, W. H. Fruit growing in West Virginia. Trans. Indiana Hortic. Soc. 1918: 145-147. 1919.—Popular.

882. ALDERMAN, W. H. Is thinning fruit profitable? Trans. Indiana Hortic. Soc. 1918: 75-91, 176-177. 1 fig. 1919.—The author discusses the results of experiments on thinning of apples in West Virginia. The experiments were begun in 1912 on the varieties, York Imperial, Ben Davis, Rome, and Baldwin. The objects were: (1), to determine the effect of thinning on the size and quality of the fruit of that crop; (2) to determine the best time to thin; (3) to determine the effect on the next year's crop. The results over a 5-year period on a study of 41 varieties showed thinning to have a marked effect on the size of the fruit and it increased the amount of marketable fruit. There was no influence on the quality of the fruit except color. The color of the fruit was strikingly improved. The results also showed that the cropping habit of the tree could not be varied very much by thinning and the evidence would indicate that thinning of fruit had absolutely no effect of the crop of the succeeding year. Furthermore, from the evidence at hand there was nothing to indicate that thinning the fruit from the spur this year would cause it to fruit next year. The author states that the best time to thin is just after the June drop, from June 15, to July 1. The most satisfactory results in size and number of fruits per tree were obtained when the fruits were thinned from 6 to 7 inches apart on the branch. The author also states that if trees are bearing heavily and are not in the most vigorous condition, it will pay and pay well to thin for the sake of the one crop, but it should not be expected that the thinning will influence the crop of the succeeding year.—F. P. Cullinan.

883. ANONYMOUS. The new overbearing raspberry, La France. Florists' Exchange 48: 738. 3 fig. 1919.—Both fruit and foliage of this new raspberry, La France, were seen at the autumn flower shows in New York. The writer, on October 10, 1919, saw 40,000 plants in the nursery and private garden of the discoverer. The canes and leaves are stiffer than those of the Cuthbert, and have but few spines. La France sends out a great number of underground stems from which heavy shoots spring, sometimes at a distance of 10 feet from the parent plant, on which fruit is borne the first season. La France was fruiting heavily when seen, though frosts the two nights previous had nipped all tender vegetation. The fruit is borne in racemes, 1 to 3 feet long, on the under side of the tops of the canes. In one and the same raceme were seen buds, blooms, fruit just setting, and green and ripe berries. The individual berry of La France is about twice as heavy as that of the Cuthbert, and the drupes from two to three times as large as those of other berries. The berry is deep pink in color, juicy, and of delicious flavor. The owner stated that La France is a chance seedling, found by him in 1913, and tested for 6 years. It has a long bearing season, from the middle of June onward, and the autumn crop is heavier than the June crop. The canes of La France survived the winter of 1917-18 without injury, while standard varieties of raspberries and of blackberries were killed to the ground.—L. A. Minns.

884. ANONYMOUS. Trained fruit trees. Nation. Nurseryman 27: 157. 1 fig. 1919.—It is possible to train fruit trees to grow on walls in America as in Europe, the climatic conditions presenting no difficulties.—W. N. Clute.

885. ANONYMOUS. *La piña, fruta Americana*. [The pineapple, an American fruit.] *Revista Agric. [Mexico]* 3: 452-457. 1 fig. 1919.—Reprinted from Bull. Pan-American Union.

886. ANONYMOUS. Orchard heaters emitting smoke lighter than air, may be used. *California Citrograph* 5: 20. 1919.—At the close of a lawsuit brought by orange growers to restrain the city of Pomona from enforcing the provisions of the Anti-Smudge Ordinance, Judge J. W. Sherk of the superior court of Los Angeles County, California ruled: First, that the municipality has no right to prohibit the emission of that degree and quality of smoke which is necessarily caused in the operation of the modern type of orchard heaters, carefully cared for and regulated. Second, that the courts will have in mind in determining the reasonableness of such ordinances the necessities of orchard heating, the magnitude of the interests, and the importance of the industry. Third, that the court will restrain municipalities and their officers from the enforcement of such ordinances containing unreasonable and unnecessary restrictions on the emission of smoke. Fourth, that the courts will not uphold the unreasonable and unnecessary emission of dense, black smoke constituting a public nuisance.—*J. E. Coit*.

887. ANONYMOUS. The coco-nut industry in Malaya and its future prospects. *Tropical Life* 15: 103. 1919.—A compilation showing that Malaya had in 1917, 200,000 to 225,000 acres devoted to coconuts. The erection of modern oil mills is advised so that the product can be marketed as oil rather than copra. The wonderful increase in oil export in the Philippines after 1912 when modern mills were brought in there is noted. In 1912 the Philippines exported 169,000 metric tons of copra and almost no oil; in 1913 the export of coco-nut oil was 1300 tons, and in 1918 over 100,000 tons with a value of about \$30,000,000.—*H. N. Vinall*.

888. ANONYMOUS. *Delphiniums*. *Missouri Bot. Gard. Bull.* 7: 57-59. 1919.—Cultural methods are described and twenty-four species are tabulated with the color, time of bloom, height, habit, and habitat of each.—*O. T. Wilson*.

889. ANONYMOUS. Flowering palms. *Missouri Bot. Gard. Bull.* 7: 46-48. *Pl.* 14-15. 1919.—Palms usually flower and fruit only in their native habitats. A number of species are listed which have been induced to fruit in the St. Louis conservatories.—*O. T. Wilson*.

890. ANONYMOUS. Killing weeds with live steam. *Sci. Amer.* 120²²: 599, 613-614. 1919.

891. ANONYMOUS. Shasta strawberry vines. *Sci. Amer.* 121¹⁰: 223. 1919.—Records the marketing, on a large scale, of strawberry plants.—*Chas. H. Otis*.

892. ANONYMOUS. The fruit-growers' sleight of hand. Some of the things that are accomplished by skillful grafting and related processes. *Sci. Amer. Supplem.* 88²²⁷: 28-29. 7 fig. 1919.

893. ANSTEAD, RUDOLPH D. Improvement of coffee by seed selection and hybridization. *Agric. Jour. India* 14: 639-644. 1919.—An address delivered at the coffee planters conference held at Mysore in July, 1918.—*J. J. Skinner*.

894. ANSTEAD, RUDOLPH D. The coffee planting industry in Southern India. *Agric. Jour. India* 14: 578-585. 1919.—At the present time there are 223,095 acres in South India devoted to the production of coffee. The coffee-growing areas are Mysore and Coorg which contain 74 per cent of the total. A general discussion of coffee growing is given. Lime and phosphate fertilizers have been used and give good returns. Leaf disease (*Hemileia vastatrix*), (*Corticium Koleroga*) are described, and remedies suggested. The majority of coffee grown in South India is of *arabica* variety. Recently some *robusta* coffee has been planted, which is favored for poor soils.—*J. J. Skinner*.

895. ARNOLD, JULSON. Chinese products of interest to nurserymen. *Nation. Nurseryman* 27: 20-21. 1919.—Products of China's dietary as well as other plant products are dis-

cussed.—In 1917 China exported 200 tons of dried edible mushrooms. They are grown in the mountainous districts on hardwood logs felled for the purpose. Incisions are made in the logs, liquid manure is poured over them, and when this is rotted the fungi spring forth.—Narcissus bulbs are produced in abundance near Amoy, three millions being shipped annually, one third of which go abroad.—In the Southern Provinces of China many varieties of oranges are grown, 6000 tons of this fruit being annually exported. It is stated that 80 different varieties of oranges are produced in China.—Jujubes and persimmons are grown in abundance, 3000 tons being exported annually.—Gall nuts which are produced by insects on certain native trees are used to dye silks black, in tanning, and as medicine. Exports of these gallnuts amount to 1 million taels annually, 75 per cent going to the United States.—Ginger (*Zinziber officinale*) is grown extensively in several Provinces. China exports 5000 tons of it annually.—Camphor (*Cinnamomum Camphora*) is obtained from the camphor tree by destructive distillation. There has been no systematic replanting of these trees and as a result the supplies from Fukien, the chief source of camphor, have been nearly exhausted.—Cassia bark and oil are obtained from *Cinnamomum cassia*, a large tree found in southern China. Methods of obtaining these products are discussed.—Castor beans are found generally throughout China and she has furnished considerable quantities during the war for use as a lubricant for motors.—J. H. Gourley.

896. BALME, JUAN. *Notas sobre frutales en Mexico*. [Notes on fruit trees in Mexico.] Revista Agric. [Mexico] 4: 224-226. 2 fig. 1919.—Named varieties of apples developed in Mexico and general notes on Mexican fruit growing possibilities.—John A. Stevenson.

897. BALME, JUAN. *El higo de esmirna*. [The Smyrna fig.] Revista Agric. [Mexico] 4: 317-319. 2 fig. 1919.—Popular account of fig growing and its possibilities in Mexico.—John A. Stevenson.

898. BATCHELOR, L. D., AND H. S. REED. *Winter injury or die-back of the walnut*.—California Agric. Exp. Sta. Circ. 216: 1-20. 1919.—Different types of the die-back are described and illustrated. Data and observations are given, showing the relation of die-back to at least four causes, early autumn frosts, winter drought, high water table and alkali soil. Experiments showing how a more adequate irrigation corrected the trouble when due to winter drought, are described.—H. S. Fawcett.

899. BLAKE, S. F. *The anay, a new edible-fruited relative of the avocado*. Jour. Washington [D. C.] Acad. Sci. 9: 457-462. Fig. 1. 1919.—See Bot. Absts. 4, Entry 1697.

900. BRIERLY, W. G. *The effects of fall and winter pruning in Minnesota*. Rept. Iowa State Hortic. Soc. 53: 109-115. 1918.—A brief discussion on pruning in Minnesota. The author states it has made no great difference whether trees were pruned in November or June. Winter pruning has produced no injury.—L. H. Pammel.

901. BROOKS, CHARLES, J. S. COOLEY, AND D. F. FISHER. *Nature and control of apple scald*. Jour. Agric. Res. 18: 211-240. 1919.—See Bot. Absts. 4, Entry 1617.

902. CAMPBELL, J. A. *The fruit industry of British Columbia*. New Zealand Jour. Agric. 18: 361-364. 1919.—Mr. Campbell is investigating the fruit industry of the United States and Canada. Only apple orchards are considered in this report and the subjects covered are the trees-stock, pruning, etc.; pests and diseases-spraying compounds; the Okanagan Valley; marketing and cooperation—the Okanagan United Growers. Many of the orchard practices are found to be quite different from those of New Zealand.—N. J. Giddings.

903. CAMPBELL, J. H., AND W. H. TAYLOR. *Orchard establishment and the formation of young fruit trees*. New Zealand Jour. Agric. 19: 1-15. Fig. 1-8. 1919.—The ideal aspect for an orchard site in New Zealand is a valley having a gentle northerly slope with a barrier of hills cutting off the southerly winds. The open end of the valley can be easily provided with tall sheltering trees. An orchard should, however, be fully exposed to the sun.—A wide

range of soil may be used but pipe clay within a foot of the surface is to be avoided as under such conditions powdery mildew is a permanent and persistent pest. Drainage is essential where the soil is water logged.—Apple and pear trees may be dipped in a red oil solution and stone fruit in lime sulphur, each of 1 to 10 strengths. On rich land 20 feet is about the best distance apart.—The young trees are pruned to restore the balance of top and root, and to lay the foundation of the future tree. Three or four branches form the head of the tree, the lowest one 10 to 12 inches from the ground. They should not be opposite each other and should be cut back so the total height of the tree is about 18 inches. Summer pruning should be practiced to select the permanent branches and keep them within bounds so they may not be broken by the wind. The second season the main branches are cut back to about 8 inches. In the summer strong growths within the tree are removed and if the leaders bend over they are shortened.—*J. K. Shaw.*

904. CAÑEDO, JENARO. *La vid.* [The vine.] Jalisco Rural [Mexico] 1: 225-228, 236-238; 2: 24-26. 1919.—A popular account of the cultivation and propagation of the grape.—*John A. Stevenson.*

905. CAVANAUGH, J. R. *Packing and grading.* Trans. Indiana Hortic. Soc. 1918: 177-184. 1 pl. 1919.—The benefits to be derived from grading are presented along with a discussion of the grades suggested by the Bureau of Markets.—*F. P. Cullinan.*

906. CHANDLER, W. H. *Pollination.* Trans. Indiana Hortic. Soc. 1918: 111-120, 173-175. 1919.—Cool weather at blooming time caused losses in New York in 1915, 1916 and 1917 because of imperfect pollination. Generally fruit will not grow except through the stimulus of a developing seed. Some varieties are self-fertile, others are self-sterile. This point has been determined for only a few varieties. Bagging the blossoms is one method of testing a variety. Waite's work on pear varieties is reviewed, in which he proved the Bartlett pear self-sterile and the Seckel self-fertile. Peaches and sour cherries are self-fertile. Sweet cherries and American plums are self-sterile. Among apples, Rome Beauty, York Imperial, and Rhode Island Greening are self-sterile, Newtown, Baldwin, and Grimes are self-fertile. The work of Lewis on other varieties is quoted. The remedy for self-sterility is mixed planting and keeping bees. In case of apple and pear, the condition of the tree may influence the set, since on the weak spurs more seeds are necessary to hold the fruit at the time of the June drop. In the discussion are considered the self-sterility of the Delicious, method of interplanting varieties, the June drop, the effect of pollination on flesh color, and the use of Austrian bees. *Max W. Gardner.*

907. CHANDLER, W. H. *Pruning—its effect on production.* Trans. Indiana Hortic. Soc. 1918: 137-145, 156-161. 1919.—This article is a discussion of the subject of pruning based on the author's investigations. The effect of pruning is to reduce the total amount of growth. Pruning during the dormant season increases the vigor of growth during the following season of adjacent twigs that are left. The new shoots will be longer and the growth is generally stockier. In spite of this increase in vigor, the effect of pruning is to reduce the total amount of growth. There are fewer growing points left and not only is the new growth insufficient to replace what has been removed, but in actual fact less growth is made than on the unpruned tree. Pruning by removing buds that would open into leaves, reduces the foliage and, hence, the consequent decrease of elaborated food manifests itself in reduced growth. This is shown in an examination of 15 one-year old apple trees in the nursery row which the author states had their leaves removed to a height of about 20 inches above the ground. At the end of the season the weight of the roots was 38 per cent less and that of the tops 40 per cent less than those of the unpruned trees that were no larger at the beginning of the experiment. Pruning markedly reduces the fruitfulness during the early years of the life of the tree. It was found that even the amount of pruning necessary to secure an open head reduced the amount of fruit borne by the young tree. The author points out that in case of old trees, however, pruning may have the effect of increasing fruitfulness. In an old unpruned tree where most of the growth is in the spur, the effect of pruning would be to increase the vigor and

to stimulate new growth on which would be formed new spurs that would be larger and more vigorous. For fruits other than the apple, with the exception of the cherry, which seems to need little pruning, renewal pruning is recommended.—*F. P. Cullinan*.

908. CHANDLER, W. H. The effect of cold winter of 1917-18 on the fruit industry. Trans. Indiana Hortie. Soc. 1918: 91-103. 1 pl. 1919.—The freezing injury of the winter of 1917-18 was the worst in the history of American apple growing. In apples and pears, the sapwood and sometimes the bark of the spurs were killed, and in all fruits, the twigs were killed. There was much killing of the sapwood in the larger branches. In New York, the Rhode Island Greening variety suffered most injury in the spurs and twigs, the Ben Davis in the sapwood of the branches. The bark was often killed where the wood was not well ripened, especially near the base of the tree, or in the crotches. Crotch injury was common in young pear and apple trees. Some varieties such as Northern Spy and Fameuse show crotch injury where twigs and spurs are not injured. Crotch injury is slower to heal and more serious than killed twigs, spurs, or sapwood on the branches or trunk. Often in pears, and apples also, the bark is killed and the cambium remains alive.—The peach is most susceptible to freezing injury and while twigs, small and large branches, and trunk are all equally liable to injury, the peach tree shows remarkable ability to recover. No peach buds survived the winter. Recovery is facilitated by the addition of two to four pounds of nitrate of soda to the soil. Old trees are more liable to die than young trees, and trees that bore a heavy crop in 1917 showed less ability to recover. In New York, apricots proved more hardy than peaches, the wood being largely uninjured and many buds surviving. Sweet cherries did not appear to be as seriously injured as peaches but did not exhibit the ability to recover and by fall were in as bad condition as peach trees in some sections.—25°F. kills cherry buds. Quince trees suffered from the killing of portions of the 1917 twigs. Few pear trees were killed entirely and while considerable injury to spurs, twigs, trunk, and crotches was suffered, pear trees showed marked ability to recover. Tender and hardy varieties are listed.—In New York, the most tender apple varieties were the Baldwin, Tompkins King, and Rhode Island Greening. McIntosh and Oldenburg were most resistant. The short summer of 1917 prevented wood from going into the winter in a well ripened condition. Premature defoliation, severe pruning, and a heavy yield predisposed to winter injury. Nitrate of soda is preferable to manure as a fertilizer as it is more quickly available and less prolonged in its effect, thus causing an early foliage development and early maturity of the wood. Weak trees of bearing age, especially among pears, are apt to start a very undesirable late season cambial growth. As to treatment, dead branches may be pruned at any time, but weakened branches should be left until after the following summer's growth.—In the subsequent discussion, the point is made that in the freezing the water comes out of the cells and forms ice around them. Killing does not take place until ice formation occurs. The question of cultivation of injured peach orchards and of varietal susceptibility among peaches is also discussed.—*Max W. Gardner*.

909. CHEVALIER, A. *Le Coffea excelsa et sa culture*. [*Coffea excelsa and its culture*.] Bull. Agric. Inst. Sci. Saigon 1: 13-19. 1919.

910. CHEVALIER, A. *Les cultures fruitières en Indochine*. [*Fruits cultivated in Indo-China*.] Bull. Agric. Inst. Sci. Saigon 1: 97-111. 1919.

911. CHEVALIER, A. *Le pommier à cidre des hauts plateaux de l'Indochine*. [*The cider apple of the high plateaus of Indo-china*.] Bull. Agric. Inst. Sci. Saigon 1: 142-150. 1919.

912. COIT, J. E. Automatic disbudding of citrus. California Citrograph 5: 37. Fig. 1. 1919.—Attention is called to the fact that citrus trees do not produce terminal buds; that upon the cessation of growth of a shoot the growing tip is abscised; and that the presence of these dead tips in the trees is normal and not a symptom of disease as has been represented by some.—*J. E. Coit*.

913. COWAN, JAMES. Crop production in the northern sandhills. Nebraska Agric. Exp. Sta. Bull. 171. 8 p. 1919.—See Bot. Absts. 4, Entry 52.

914. CROCKER, WILLIAM. Conditions affecting flower development. [Rev. of: (1) KLEBS, GEORGE. Ueber die Blütenbildung von *Sempervivum*. (Blossom formation in *Sempervivum*.) Festschrift zum Ernst Stahl 128-151. Jena, 1918. (2) FISCHER, H. Zur Frage der Kohlensäure-Ernährung der Pflanzen. (Concerning the carbon-dioxide assimilation of the plant.) Gartenflora 65: 232-237. 1916. (3) KRAUS, E. J., AND H. R. KRAYBILL. Vegetation and reproduction with special reference to the tomato. Oregon Agric. Exp. Sta. Bull. 149. 90 p. 1918.] Bot. Gaz. 67: 445-446. May, 1919.—See Bot. Absts. 4, Entry 1553.

915. CRUICKSHANK, ROBERT B. Orchard fertilization. Trans. Indiana Hortic. Soc. 1918: 121-137. 1 pl., 3 fig. 1919.—A discussion is given on the results of experiments on the fertilization of the poorer orchard soils of southern Ohio. Nitrogen in the form of nitrate of soda has shown itself to be the necessary element in the great increase in production and improvement in vigor of the hill orchards of southern Ohio. Potash has been of no value in Ohio as an orchard fertilizer. Phosphorus in the form of acid phosphate, even when used with nitrate of soda, has had no effect either in increased production or in growth of tree. However, it has been valuable as a means of obtaining and maintaining clover in the orchard and in this way has increased the organic matter of the soil. For thin soils such as those worked with in southern Ohio, the author recommends a 5 to 5 combination, 5 pounds each of nitrate of soda and acid phosphate to the tree. The nitrate of soda will promote growth of the tree and production of fruit and will aid in the growth of the grasses. The acid phosphate, while not benefiting the tree, will aid in the growth of the clover. The best results from nitrate of soda were obtained when the material was applied just about the time the blossoms were showing pink.—*F. P. Cullinan*.

916. CRUICKSHANK, R. B. War time orcharding. Trans. Indiana Hortic. Soc. 1918: 48-68. 1919.—A discussion of orchard operation with suggestions for economy of time and labor during the war period.—*F. P. Cullinan*.

917. DAVIS, R. A. Fruit and fruit products of South Africa, I.—Deciduous fruit. South African Jour. Indust. 2: 774-783. 1919.

918. DAVIS, R. A. Fruit and fruit products of South Africa, II.—Citrus and other non-deciduous fruits, berries and nuts. South African Jour. Indust. 2: 853-866. 1919.

919. DE CASTELLA, F. Repruning of vines damaged by frost. Jour. Dept. Agric. Victoria 17: 606-614. 8 fig. 1919.

920. ESBJERG, NIELS. Forsøg med sorter af stikkelsbaer og Solbaer. [Experiments with varieties of gooseberries, currants and black currants.] Tidsskr. Landbrug. Planteavl 26: 52-79. 1919.—The variety experiments were started in 1909 at the Spangsbjerg Station, Esbjerg, Denmark. Eight plants of each variety were planted in 5 plots and picking commenced in 1911, data until 1917 being presented. Fields were recorded as follows in hektogrammes per hectare.—Red-berried gooseberry varieties, picked ripe: Achilles 1237; Sproffens Goliath 1119; London Market 982; Whinham's Industry 724; Crown Bob 675; Non Plus Ultra 492; Victoria 315; Williams 300.—Green-berried gooseberry varieties, picked ripe 1911-14, unripe 1915-17 (shown parenthetically)—Whitesmith 414 (741); Keepsake 317 (649); Gottlieb 214 (595); Green Willow 248 (528); Brougham 133 (447); Profit 249 (365); Favorite 133 (240). Currant varieties—Red Dutch 433; Fay's New Red Prolific 212; Cherry Dutch 187; la Fertile 105. Black currant varieties—Black Naples 313; Bang-up 396; Queen Victoria 275; Ogden's Grape 217.—*Albert A. Hansen*.

921. FAIRCHILD, DAVID. The palate of civilized man and its influence on agriculture. Sci. Amer. Supplem. 87: 68-71. 8 fig. 1919.

922. FOLGER, J. C. The commercial apple industry in the United States. U. S. Dept. Agric. Yearbook 1918: 367-379. Pl. 2, 3 fig. 1919.—Apple production is increasing in importance. Apples rank ninth in farm crops. Farm orchards are sharply distinguished from

commercial. The farm orchard is no factor in the commercial industry. Increased production is due to the commercial orchard. The survey shows seven major apple producing regions as follows: New York, New England, the Shenandoah, Cumberland and Piedmont regions, Michigan and Illinois, the Ozark and Missouri River region, the western irrigated region, and the Washington region. There are six or seven minor regions. The future of the apple industry is very promising. Apple production does not respond quickly to the law of supply and demand. Some of the regions are at maximum production and as a result of little planting since 1910, it seems not improbable that a shortage with high prices will result in the near future. Increased population, movement to cities, the cessation of war with the probable extension of foreign markets will all aid the commercial outlook.—*C. J. Shirk.*

923. GARDNER, F. A few observations on what I have noticed in fruit culture during the season of 1918. Rept. Iowa State Hortic. Soc. 53:107-109. 1918.—A brief discussion of hybrid apples, plums and growing of strawberries.—*L. H. Pammel.*

924. GINARTE, BENJAMÍN MUÑOZ. Consideraciones sobre el cultivo de la Piña en Cuba. III. [Cultivation of the pineapple in Cuba.] Revist. Agric. Com. y. Trab. 2:426-430. Fig. 13-16. 1919.—This installment treats of the production of new varieties from seed, of insects and diseases which attack them, and of the foods, drinks, and textiles which may be made from the pineapple.—*F. M. Blodgett.*

925. GRAM, MICHAEL. Oversigt over Frugtavlens standpunkt og Udvikling i Landets forskellige Egne. [A report on fruit growing in Denmark.] Tidsskr. Landbrug. Planteavl 26:80-185. 1919.—An account is given of the distribution and varieties of fruits such as apples, cherries, plums, pears and small fruits, of the extent of fruit growing in Denmark and of the losses due to diseases, insects, and poor soil conditions.—*J. I. Lauritzen.*

926. GREENE, LAURENZ. 1917-1918 winter injury to apple trees. Rept. Iowa State Hortic. Soc. 53:119-124. 2 pl. 1918.—The author reports the "injury extending from north-eastern part of the United States, south and west to the Ohio and Mississippi River, becoming more severe farther east and north." "The injury was most severe on trees from three or four years of age to those twelve or fifteen years of age. Newly planted orchards of one or two years largely escaped injury. Those twenty or more years of age suffered very much less, although farther east these older trees, under certain conditions, suffered very much more." The paper gave as varieties most injured: Indiana: Baldwin, Stayman, Ben Davis, York Imperial; In New York: Baldwin, King, Rhode Island Greening, and Ben Davis. The Winesap in Indiana was fairly resistant. "In the case of young trees, anything that checked the growth early and ripened the wood reduced the injury. Young trees on poorly drained soil suffered less."—*L. H. Pammel.*

927. GREENE, WESLEY. Secretary's report. Report Iowa State Hortic. Soc. 53:14-18. 1918.—Summary of horticultural crops for Iowa for the year 1918.—*L. H. Pammel.*

928. GRIEBEL, C., AND A. SCHÄFER. Zur Zusammensetzung der Inklusen, gleichzeitig ein Beitrag zur Kenntnis der Vorgänge beim Teigigwerden der Früchte. [The composition of "Inclusions" and the process of mellowing of fruits.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 37:97-111. 1919.—See Bot. Absts. 4, Entry 1454.

929. GUILFORD, W. H. The old pear trees of Dubuque county. Rept. Iowa State Hortic. Soc. 53:314. 1918.—Notes showing that some of the early French and German settlers planted pears, some of the trees still growing and these trees are seventy years old.—*L. H. Pammel.*

930. HARRIS, WM. The peanut or groundnut. Jour. Jamaica Agric. Soc. 23:263-265. 1919.—Description of the plant, cultivation, harvesting, yields, uses, and food value.—*John A. Stevenson.*

931. HEDRICK, U. P., AND R. D. ANTHONY. Twenty years of fertilizers in an apple orchard. New York Agric. Exp. Sta. [Geneva] Bull. 460: 71-96. *Fig. 1.* 1919.—A report on an experiment conducted in a cultivated orchard on heavy clay loam soil at Geneva, N. Y. The results, as measured by the yield of fruit and tree growth, were, in general, so contradictory and inconclusive that no conclusion of practical value could be drawn.—*F. C. Stewart.*

932. HUME, H. HAROLD. Present day nursery problems. Amer. Nurseryman 33: 146. 1919.—Among other problems confronting this group of horticulturists the writer discusses the practicability of the Quarantine Acts of the Federal Horticultural Board, and favors an effort to grow ornamental and fruit stocks in America.—*J. H. Gourley.*

933. JOHNSTON, EARL S. An index of hardiness in peach buds. Amer. Jour. Bot. 6: 373-379. *Fig. 1-2.* 1919.—See Bot. Absts. 4, Entry 1587.

934. LITTLE, JAMES A. A tribute to the pawpaw. Trans. Indiana Hort. Soc. 1918: 312-319. *1 fig.* 1919.—The horticultural characteristics of the tree and fruit are presented. Trees may be grown from seed if shaded for 1 or 2 years and will bear in 6 to 8 years. Grafting is feasible. Fruit is borne every year. Although not suitable for shipment, the fruit is desirable for home use and local market.—*Max W. Gardner.*

935. McCLELLAND, T. B. Efecto de diferentes metodos de trasplantar café. [Effect of different methods of transplanting coffee.] Porto Rico Agric. Sta. Bull. 22: 1-12. *1 pl.* Span. ed. 1919. [Eng. ed. 1917.]—Tests were made to demonstrate the advantages and disadvantages of different methods of transplanting coffee seedlings. There were no appreciable differences, in the case of year old seedlings with five to six pairs of leaves, between those taken up with a ball of earth about the roots and those set out bare of earth. When the seedlings were left in the nursery eighteen to twenty months, however, an earlier growth and increased yield resulted in the case of plants set out with a ball of earth over those removed with roots free of soil. The increased growth was found to be from 12 to 43 per cent greater and the yield doubled or tripled at the end of the second year. Recommendations for seed selection, proper methods of pulping and drying the seed, care of nurseries, and a method of transplanting to holes prepared in advance are given.—*John A. Stevenson.*

936. MERCIER, C. A. The electrification of seeds. Sci. Amer. 120: 142-143. *6 fig.* 1919.—See Bot. Absts. 4, Entry 104.

937. MIÉVILLE, R. Culture des arbres fruitiers d'Europe au Laos et au Tonkin. [Cultivation of European fruits in Laos and Tonkin.] Bull. Agric. Inst. Sci. Saigon 1: 111-116. 1919.

938. MOORE, JAMES G. Some recent facts significant in horticulture. Rept. Iowa State Hort. Soc. 53: 66-73. 1918.—The author discusses inspection of fruit, the mutual relationship of fruit growers, and emphasis on horticultural teaching.—*L. H. Pammel.*

939. OSKAMP, JOSEPH. Planting fruit trees. Trans. Indiana Hort. Soc. 1918: 323-328. *3 fig.* 1919.—Directions are given for choice of nursery stock, heeling-in, and planting, with notes on varieties for Indiana.—*F. P. Cullinan.*

940. PATTEN, CHARLES G. Pears where pears do not usually grow. Rept. Iowa State Hort. Soc. 53: 299-300. *1 pl.* 1918.—Gives an account of pear trees on the state station grounds at Charles City, among them the Chinese pears and the *Pyrus ussuriensis*.—*L. H. Pammel.*

941. PEARCY, HARRY L. Science aids nature in causing barren trees to bear. Better Fruit 14: 8. Oct., 1919.—A brief summary of the present status of the pollination question of the sweet cherry in the Northwest. The work of V. R. GARDNER of the Oregon Agric. Coll. Exp. Sta. is especially emphasized.—*A. E. Murneek.*

942. PENNYPACKER, JOHN YOUNG. Observations on the beach plum, a study in plant variation. Contrib. Univ. Pennsylvania Bot. Lab. 4: 231-269. Pl. 66-70. 1919.—See Bot. Absts. 4, Entry 701.

943. PILLAI, N. KUNJAN. Coconut the wealth of Travancore. Agric. Jour. India 14: 608-628. 1919.—An account is given of the origin of coconut cultivation and the industry in Travancore. It is stated that the greatest possibilities in the improvement of coconut cultivation in Travancore lie in the method of manuring.—*J. J. Skinner.*

944. ROBIN, J. La culture du Cocotier dans l'île de Phu-tuc, Cochinchine. [The cultivation of the coconut palm in Phu-tuc island, Cochinchina.] Bull. Agric. Inst. Sci. Saigon 1: 201-207. 1919.

945. SCOTT, W. M., H. C. HETZEL, H. W. SAMSON, AND M. STOCKTON. Preparation of barreled apples for market. U. S. Dept. Agric. Farmers Bull. 1080. 40 p. 24 fig. 1919.

946. SKVORTZOW, B. W. Notes on the agriculture, botany and zoology of China. Jour. Roy. Asiatic Soc. North-China Branch 50: 49-107. Pl. 1-2, fig. 1-11. 1919.—See Bot. Absts. 3, Entry 2462.

947. STEVENS, NEIL E. Keeping quality of strawberries in relation to their temperature when picked. Phytopath. 9: 171-177. 1919.—Observations were made on the keeping quality of strawberries picked early in the morning while still cool and wet with dew as compared to berries picked later in the day when dry and relatively warm. Although most practical growers are prejudiced against picking and shipping wet berries the percentage of sound fruit after three to five days in nearly every case was higher in the fruit picked early in the day.—*G. F. Potter.*

948. TUFTS, WARREN P. Pruning young deciduous fruit trees. California Agric. Exp. Sta. Bull. 313: 113-153. 24 fig. 1919.—The paper is a preliminary report upon the pruning of young deciduous fruit trees. The objective aimed at is to secure better methods of shaping young trees in order to being them into earlier fruiting and to secure larger trees in a more economical way. The growth of orchard trees has been gauged by the author on trunk circumference measurements, since he has found a correlation to exist between trunk circumference and root and top weights. Experiments devised to decide between light and heavy pruning of young trees favor the light pruning with thinning and no heading back, as a means to obtaining larger and stronger trees with early fruiting. Summer pruning at any time is considered as devitalizing, whereas, midsummer cutting is more weakening than that done during the early part of the season. The low heading of young trees is recommended. Practical suggestions on the shaping of young fruit trees are offered. The methods of pruning and heading-back are amply illustrated.—*A. R. C. Haas.*

949. VON BLON, J. L. Jack Frost in the orange country. Sci. Amer. 121¹²: 278-279. 5 fig. 1919.—A description is given of the activities of cooperative frost-protective associations and methods of preventing frost damage to orange groves.—*Chas. H. Otis.*

HORTICULTURE PRODUCTS

950. ANONYMOUS. Vanilla curing in St. Kitts. Agric. News [Barbados] 18: 275. 1919.—From experiments carried out by K. E. KELSICK, it appears that: (1) Immersion in hot water is necessary in curing vanilla beans, (2) The best aroma is developed in water at 80°C. and this would therefore appear to be the optimum temperature, (3) The beans must next be sweated (a glass-topped box gave good results) at a temperature of 50°C. until they have a boiled appearance and have lost from 30 to 40 per cent of their weight, (4) After sweating they must be dried slowly at room temperature (30°C.) for about two weeks, (5) Best results are obtained by wrapping the cured beans in waxed paper and packing them in air-tight tins as soon as possible after drying, (6) The beans lose from 70 to 80 per cent in weight during the curing process.—*J. S. Dash.*

951. ANONYMOUS. Paste which preserves watermelons. *Sci. Amer.* 121¹²: 299. 1919.—See Bot. Absts. 4, Entry 1229.

952. ANONYMOUS. Varnished raisins. *Sci. Amer.* 121¹⁴: 272. 1919.—A description is given of a new process, in which grapes and raisins are dipped in boiling glucose solution, previous to drying. This prevents the skin from cracking and retains the grape sugar.—*Chas. H. Otis.*

953. BABÉ, ENRIQUE. El platano o banano como alimento y como industria. [The banana as a food and as a business.] *Revist. Agric. Com. y Trab.* 2: 424-425. 1919.—The high food value of various varieties of plantains and bananas is shown by analysis. The method of making banana flour is described. The leaves may be used as cattle feed fresh or as silage or may be used as a source of textile fiber.—*F. M. Blodgett.*

954. BIOLETTI, FREDERIC T., AND A. E. WAY. Saving raisins by sulfuring. *California Agric. Exp. Sta. Circ.* 211: 2. 1919.—An improved method of saving raisins in rainy weather by means of a sulfuring hood to confine the fumes in the stacks, is described and illustrated.—*H. S. Fawcett.*

955. BUTTENBERG, P. Fruchtaroma und Geschmacksstoffe zur Herstellung von Ersatzlebensmitteln, z. B. Kunstlimonaden, Kunstmarmeladen, Gelees, Liköre usw. [Fruit aromas and flavors in food substitutes, artificial lemonades, marmalades, jellies, liquors, etc.] *Zeitschr. Untersuch. Nahrungs-u. Genussmittel* 37: 331-344. 1919.

956. COLLENS, A. E. A new bean dish. *Agric. News [Barbados]* 18: 387. 1919.—This is a short note on the preparation for table of the Vilmorin's Stringless Bonavist which, in Antigua, is finding favour as a vegetable both in the young and mature stages.—*J. S. Dash.*

957. CREVOST, C., AND C. LEMARIÉ. Plantes et produits filamenteux et textiles de l'Indochine. [Fiber and textile producing plants of Indochine.] *Bull. Econ. Indochine* 22: 365-401. *Pl.* 1-3, *fig.* 1. *Ibid.* 553-591. *Pl.* 1, 2, *fig.* 1-9. 1919.—See Bot. Absts. 4, Entry 53.

958. CRUESS, W. V. Salvaging rain-damaged prunes. *California Agric. Exp. Sta. Circ.* 212: 1-12. 1919.—The damage done to prunes by September 1918 rains is described. Exposure of wet prunes to fumes of burning sulfur is recommended, in addition to the usual methods of turning, stacking, etc. The utilization of damaged fruit for hog feed, syrup, etc., is also suggested.—*H. S. Fawcett.*

959. DEARING, CHARLES. Unfermented grape juice: How to make it in the home. *U. S. Dept. Agric. Farmers Bull.* 1075. 32 p. 20 *fig.* 1919.

960. FLOCKTON, B. P. The production and refining of edible oils. *Tropical Life* 15: 106-112. 1919.—A very complete description is given of the machinery and processes used in the manufacture of the edible oils.—*H. N. Vinall.*

961. HÄRTEL, F. Zur Bestimmung von Stärkesirup in Marmeladen nach dem Verfahren von Juckenack. [Determination of starch syrup in marmalades.] *Zeitschr. Untersuch. Nahrungs-u. Genussmittel.* 37: 65-81. 1919.

962. HOLLAND, J. H. Food and fodder plants. *Kew Bull. Misc. Inf.* [London] 1919: 1-84. 1919.—See Bot. Absts. 4, Entry 78.

963. KNAPP, A. W. Science in cacao production. *Sci. Amer. Suppl.* 87: 165. 1919.

964. KRUG, OTTO, AND HANS FILCHNER. Die Weinernte 1918 in der Pfalz. [The 1918 vintage in the Palatinate.] *Zeitschr. Untersuch. Nahrungs-u. Genussmittel* 37: 111-115. 1919.

965. KRYZ, FERDINAND. Beitrag zur Kenntnis der Reaktionen der Farbstoffe der Hagebutten, Hollunderbeeren und verwandter Beeren. [Reactions of the coloring matters of hips, elderberries, and related berries.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 37: 125-127. 1919.—These colors are subject to imitation in marmalades, etc.; identification tests are therefore offered.—*H. G. Barbour.*

966. PRESCOTT, S. C. Dried vegetables for army use. Amer. Jour. Physiol. 49: 573-577. 1919.—Dehydrated vegetables were used in fairly large quantities by the American forces, especially potatoes and soup mixtures, in all about 40,000 tons. Further work is being done to procure better quality. The chief advantages in their use are that they lower cost, occupy less storage and transportation space, keep indefinitely and give better health by a wider range of food in the ration.—*Ernest Shaw Reynolds.*

967. SCHMITT, RICHARD. Untersuchung von 1918-er Traubenmosten Frankens. [Grape musts of Franconia.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 37: 177-183. 1919.

968. VENTRE, J. Les sarments ensilés apres vendange source d'alcool et d-acide tartrique. [Grape vine ensilage as a source of alcohol and tartaric acid.] Compt. Rend. Acad. Agric. France 5: 334-340. 1919.—The paper in full, of which a review by Lindet was given in Botanical Abstracts 3, Entry 1072.—*E. A. Bessey.*

VEGETABLE CULTURE

969. ANONYMOUS. Future of vegetable seed growing in the United States. Seed World 54: 353. 1919.

970. CALVINO, MARIO. Informe del director. [Report of the director.] Informe An. Estac. Exp. Agron. [Cuba] 1917-1918: 1-439. 180 fig. 1919.—Varieties of potatoes, sweet potatoes, Jerusalem artichoke, and other root crops were grown successfully and further comparative trials planned. Among the vegetable crops tomatoes, eggplant, peppers, lettuce, chayote, Chinese mustard, sesamum, and a number of cucurbits were tested and for the most part successfully. The Klondyke, Missionary, Aroma and Gibson were among the best strawberry varieties grown. New and promising varieties of mangos and avocados were found and are being propagated for future distribution. Other fruit and nut trees are under observation, such as *Citrus* in many varieties, papaya (*Carica papaya*), grapes, the native walnut (*Juglans insularis*), pecan, and Queensland nut (*Macadamia ternifolia*), Japanese chestnut (*Castanea crenata*) and a relative of the papaya (*Jacaratia mexicana*). *Salvia hispanica* was grown during the winter months. [See Bot. Absts. 3, Entry 2586; 4, Entry 45.]—*John A. Stevenson.*

971. HIGGINS, J. EDGAR. Report of the horticultural division. Hawaii Agric. Exp. Sta. Rept. 1918: 7, 8, 13-21. Pl. 2, 3. 1919.—Investigations were conducted with 13 varieties of string beans for canning purposes. In the tomato breeding work, the Earliana, a standard variety, was crossed with the small wild form and also with some of the "plum" and "pear" varieties resistant to the melon fly (*Dacus cucurbitae*), the crosses resulting in an intermediate form highly resistant to the melon fly. Several new pineapple seedlings of the Smooth Cayenne and of hybrids of Queen X Smooth Cayenne are under observation and test.—*J. M. Westgate.*

972. KINMAN, C. F., AND McCLELLAND, T. B. Experimentos sobre el supuesto deterioro de diferentes legumbres en Puerto Rico, con indicaciones para la preservacion de la semilla. [Experiments on the supposed deterioration of vegetables in Porto Rico, with suggestions for seed preservation.] Porto Rico Agric. Exp. Sta. Bull. 20: 1-32. 8 fig. Span. ed. 1919. [Eng. ed. 1916.]—Experiments with a number of common vegetables were made in order to test out the common belief that northern vegetables degenerate when grown in the Tropics. It was found that this was due to loss of viability when the seed was exposed to the moist air and

to growing at the wrong season. Seed stored in air-tight jars in the bottom of which calcium chloride had been placed maintained their viability. Plantings of peppers, beans, okra, tomatoes and lettuce made over a period of five years and during all seasons failed to indicate any degeneration of native seed as compared with northern grown seed when properly cared for. "In all vegetable plantings the season at which the planting was made had a very pronounced effect on the yield, being the predominant factor influencing production."—*John A. Stevenson.*

973. SANCHEZ, A. *El chayote.* [The chayote.] Bol. Camara Agric. Nacion. Leon [Mexico] 6: 335-339. 1919.—A popular account of the culture of the chayote (*Sechium edule*) as practised in Mexico.—*John A. Stevenson.*

974. VARELA, E. *El frijol dolico.* [The Dolichos bean.] Revista Agric. [Mexico] 4: 18-20. 2 fig. 1919.—See Bot. Absts. 4, Entry 138.

975. WHEELER, W. A., AND G. C. EDLER. Some effects of war upon the seed industry of the United States. U. S. Dept. Agric. Yearbook 1918: 195-215. 1919.—The seed industry was affected materially by the war. Rapid strides were made but many of the effects are probably only temporary. Imports of seeds decreased greatly and exports increased as shown by statistics. The rise of the small gardener produced a great domestic demand. Maps were given showing the location of the principal seed producing areas in the United States. Due to the demand, quantity rather than quality prevailed, novelties were minimized, standard varieties emphasized. The seed industry was adversely affected by transportation facilities, local problems, and banking conditions. The bureau of markets established a seed reporting service to stabilize conditions. The difficulties appear not insurmountable.—*C. J. Shirk.*

976. YOUNGKEN, HEBER W. Notes on the dasheen and chayote. Amer. Jour. Bot. 6: 380-386. Fig. 1-5. 1919.—Two exotic vegetables recently introduced into the United States, the Trinidad dasheen (a variety of *Colocasia esculenta* (L.) Schott) and the chayote (*Chayota edulis* Jacq.) are described in detail as to history, external characters of the plant histology of the fruit, and economic value and uses. The corms of the dasheen are employed in the same way as white potatoes, the aerial shoots as asparagus and the fruits of the chayote as squash. [See Bot. Absts. 3, Entry 2792.]—*E. W. Sinnott.*

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

977. ANONYMOUS. Honey. Newest theories concerning the function of the nectary in flowers. Sci. Amer. Supplem. 88: 22-23. 1919. [Translation of extracts of an exhaustive article by M. GASTON BONNIER in *La Revue Hebdomadaire* (Paris).]

978. ANONYMOUS. (A. H. C.) [Rev. of: BOWER, F. O., J. G. KERR, AND W. E. AGAR. Lectures on sex and heredity delivered in Glasgow, 1917-18. 16mo. vi + 119 p.] Macmillan Co.: London, 1919. Jour. Botany 57: 287-288. 1919.

979. ARTSCHWAGER, ERNST F. A new fixative for paraffin sections. [Rev. of: SZOMBATHY, KOLOMAN. Neue Methode zum Aufkleben von Paraffinschnitten. (New methods for the mounting of paraffin sections.) Zeitschr. Wiss. Mikrosk. 34: 334-336. 1918.] Bot. Gaz. 67: 373-374. 1919.—The reviewer has tested this method and finds it to be excellent. Material difficult to retain on the slide, such as moss archegonia and sections of grass leaves, adhered to the slides even when left in running water for several days. The new fixative is easily prepared, keeps well, and should come into general use.—*H. C. Cowles.*

980. BAILEY, IRVING W. Structure, development, and distribution of so-called rim or bars of Sanio. Bot. Gaz. 67: 449-468. 3 pl. June, 1918.—Bandlike thickenings of the middle lamella and scalariform primary pit areas are characteristic of tracheids which have scalariform bordered pits, and are widely distributed among pteridophytes, gymnosperms and angiosperms. The middle lamella frequently retains its typical scalariform structure after the secondary wall has lost it. In the gymnosperms, as well as in the pteridophytes and angiosperms, there appear to be transitions between primary membranes of this type and others in which the scalariform structure is profoundly modified. There is much evidence suggesting that the types of unconformity and peculiar bandlike thickenings of the middle lamella are concomitants of processes of modification or reduction in tracheary pitting.—I. W. Bailey.

981. BAUMGÄRTEL, OTTO. Studien über Pneumatocarpien. [Studies on inflated fruits.] Sitzungsber. K. Akad. Wiss. Wien (Math.-Nat. Kl.) 126: 13-40. Pl. 1, fig. 1-4. 1917.—See Bot. Absts. 4, Entry 1526.

982. BAUMGÄRTEL, OTTO. Die Anatomie der Gattung *Arthrocnemum* Moq. [The anatomy of the genus *Arthrocnemum* Moq.] Sitzungsber. K. Akad. Wiss. Wien (Math.-Naturw. Kl.) 126: 41-74. Fig. 1-14. 1917.—An anatomical study was made of *Arthrocnemum*, a genus of the Chenopodiaceae near *Salicornia*, to determine whether these two genera possess any anatomical variations of a fundamental nature which might serve as generic characters. Preserved and dried materials were used. Studies were made of sections from tips of mature and developing roots, shoots, and seedlings. Cultures were grown in order to determine the effect of external conditions upon the anatomical and morphological characteristics. Details of the anatomical findings are given. The author concludes that because of the ease with which these species adapt themselves to changes in environment these succulent *Salicorniae* must be a relatively recent group and not relics of older Chenopodiaceae as Volker has suggested.—W. C. Muenschner.

983. BECK, V. MANNAGETTA, AND G. LERCHENAU. Wacholderbeeren mit entblöszten Samen. [Juniper berries with exposed seeds.] Sitzungsber. K. Akad. Wiss. Wien (Math.-Nat. Kl.) 126: 403-419. Fig. 1-31. 1917.—In a study of living and herbarium specimens of a large number of species, it was found that some individuals of most species of *Juniperus* produce some fruits with exposed seeds. Exposed seeds rarely occur in normal fruits. The cause for exposed seeds seems to be unequal growth in the seeds and enveloping fleshy scales, resulting in the piercing of the fleshy scales by the seeds in the *Sabina* section; or in the failure of the scales to grow completely over the seeds or in breaking apart of the scales in the *Oxycedrus* section. The authors give a review of the literature relating to this subject.—W. C. Muenschner.

984. CHRYSLER, M. A. The living cycads. [Rev. of: CHAMBERLAIN, C. J. The living cycads. Univ. Chicago Sci. Ser. 172 p., 91 fig. Univ. Chicago Press: Chicago, 1919 (See Bot. Absts. 2, Entry 751; 3, Entry 142).] Bot. Gaz. 67: 512-513. 1919.—The reviewer states that this book is written by the one best fitted for the task. The content is highly commended, particular satisfaction being expressed with the graphic style and the photographic illustrations.—H. C. Cowles.

985. COULTER, J. M. Apogamy in *Nephrodium*. [Rev. of: STEIL, W. N. A study of apogamy in *Nephrodium* hirtipes. Ann. Botany 33: 109-132. 3 pl. 1919. (See Bot. Absts. 2, Entry 738).] Bot. Gaz. 67: 519. 1919.

986. FEENSTRA-SLUITER, C. Waarnemingen en Beschouwingen over Bloei, Bevruchting en Zaadvorming bij *Cinchona Ledgeriana* Moens. [Observations and considerations concerning flower, frutification, and seed formation in *Cinchona ledgeriana* Moens.] Mededeel. Kina Proefstat. Dept. Landb., Nijverheid en Handel. [Tjinjirean, Java] 6: 1-35. 4 pl., fig. 1-20. 1919.—The present study was undertaken as a basis for selection and breeding work on *Cinchona*. The detailed morphology of the dimorphic flowers, their pollination and fertilization

are described and illustrated. Cross pollination was found to occur commonly through the aid of insects. It appears that this species may be either self-sterile or self-fertile though in one case seed from such fertilizations furnished weak plants. As a result of his morphological and pollination studies the writer concludes that improvement can best be attained by combining desirable characters through crossing. Since it would require too long a time to obtain pure lines with *Cinchona* the following procedure is suggested: Select two parents which are fertile when crossed, which produce a maximum amount of seed and whose hybrids combine the desired qualities. Having once found two such plants they should be multiplied sufficiently by suckering to plant a seed-garden. The free crossing between the two types should then guarantee a yearly yield of superior seed.—*R. D. Rands.*

987. FINDEIS, MARIE. Über das wachstum des Embryos im ausgesäeten Samen vor der Keimung. [On the growth of the embryos in sown seeds before germination.] Sitzungsber. K. Akad. Wiss. Wien (Math.-Nat.Kl.) 126: 77-102. 2 pl. 1917.—In a study of the seeds of ten species of flowering plants, the author finds the embryo to be larger or more fully developed at the time of germination, i.e., the exit of the radical from the seed, than at the time the ripe seed spontaneously separates from the mother plant. This is due to the growth of the embryo in the apparently ripe seed after it is planted. The time necessary for this growth varied from 8 days to 10 months in the species studied and is hastened or delayed by various factors. In certain seeds the absorption of water is necessary while in others darkness, frost, etc., are prerequisite for this embryonal growth. In all the plants discussed the growth of the embryo within the seed after planting is a process which regularly precedes the beginning of germination. However, germination does not necessarily immediately follow the completion of embryonal growth. The author concludes that this embryonal growth process in conjunction with certain other factors, is the cause for the delay in germination of ripe seeds after planting.—*V. C. Dunlap.*

988. MONDINO, ALFONSINO. Ricerche anatomiche e morfologiche sulla var. "tuberosa" Asch. dell' "*Arrhenatherum elatius*" M.K. nuovamente trovata in Piemonte. [Anatomical and morphological research on var. *tuberosa* Asch. of *Arrhenatherum elatius* M.K. recently found in Piedmont.] Atti. R. Accad. Sci. Torino 54: 782-794. 1919.—The above grain is found widely distributed in Italy, and is distinguished by the tuberosity of the internodes of the rhizome. A comparative study of the caulis, rhizome and tuberous swellings shows variations which adapt the organs to special functions. In the normal caulis the internodes are empty, but the section of the tuberous internode shows that in the tuberosity the parenchyma, which acts as a storehouse of reserve material, undergoes a preponderating development, excluding the medullary cavity. The vascular bundles, reduced in number and simplified in structure, are arranged in linear series, with the parenchyma disposed in rays so that they appear like stars, contrasting with the regularity of this tissue in the normal caulis. The tissue of the node is composed of thickened parenchyma, containing vascular bundles scattered regularly as in the normal stem. In the tuberous caulis the cuticle is notably increased for protection, and mechanical tissue is entirely reduced. The material stored up in the tuberosity is a carbohydrate, graminin, $C_4H_8O_{40}$, related to inulin. It is found dissolved in the liquid of the leucoplastids, and crystallizes in sphaerocrystals. Through hydrolysis it gives rise to laevulose. Its specific weight is 1.5222. It turns polarized light to the left, and fuses at 209°. In mass it is a light cream powder like farina, and it is insoluble in alcohol. It may prove of dietetic importance.—*Harriet M. Libby.*

989. SMITH, J. J. Nieuwe misvormingen bij klappers. [New anomalies in cocoanuts.] Teysmannia 30: 291-297. Pl. 1-4. 1919.—The paper contains descriptions and figures of anomalies observed in the cocoanut tree.—*Transformation of inflorescences into branches.* In all the leaf axils there are found branches densely covered with small linear and partly pinnate leaves, only a small inflorescence remaining at the top.—*Increase in the number of female flowers.* In some trees the inflorescences show the normal form; nearly all the female flowers produce fruit, which, however, remains very small; many of the fruits with a length of at most 11 cm., germinate normally. In other trees the inflorescences are simple, or bear only one,

or very few branches; a relatively small number of female flowers produce fruit, which attain nearly the normal size.—*Proliferation*. The female flowers of an inflorescence show foliar proliferation; the male flowers seem to have been abnormal leaving only a few fragments on the spadix.—*Fruit without seed*. The fruit has an ellipsoidal form, but is of the ordinary length.—*Fruit with two cells*. Each cell has a normal seed.—*Polyembryony*. Occasionally cocoanuts produce three or even four stems. It seems that in most of these cases the fruit is one-celled and contains one seed. As only one of the germinating holes is pierced and the young plants are wholly free from each other the phenomenon is to be ascribed to a form of polyembryony.—*J. J. Smith*.

990. STEIL, W. N. *Apospory in Pteris sulcata*. Bot. Gaz. 67: 469-482. 4 fig. 2 pl. June, 1919.—The embryo sporophyte of *Pteris sulcata* is of apogamous origin. The gametophyte generation is ordinarily produced by the germination of a spore, but under certain conditions was produced aposporously. Such gametophytes or gametophytic portions were formed in connection with the lamina or the petiole of the primary leaf. In one instance a prothallium was produced from both lamina and petiole. A sharp line of demarcation usually exists between the cells of the gametophyte and the sporophyte. The prothallial portions developed antheridia, secondary prothallia, and in one instance a sporophyte-like outgrowth. The antherozoids, produced by the aposporously developed prothallia, were actively motile and normal in appearance. Occasionally forms intermediate in character between gametophyte and sporophyte were formed. It is probable that the origin of the aposporously produced gametophyte may be traced to an early stage in the development of the embryo. Since the embryo, on account of its apogamous origin, is intimately connected with the prothallium, it is possible that cells of the prothallium may be embodied in the developing embryo. These cells, retaining the power to divide, may produce such outgrowths as have been described.—*W. N. Steil*.

991. STEVENS, NEIL E. The development of the endosperm in *Vaccinium corymbosum*. Bull. Torrey Bot. Club 46: 465-468. Fig. 1-4. 1919.—In *Vaccinium corymbosum* the development of the endosperm may begin by a cross wall, following the first division of the primary endosperm nucleus, as is the case for many other Ericaceae; or by a period of free nuclear division. This one species, therefore, exhibits methods hitherto associated with different groups.—*P. A. Munz*.

992. WATKINS, J. R. Pitch pockets and their relation to the inspection of airplane parts. Jour. Franklin Inst. 188: 245-263. Fig. 1-3. 1919.—See Bot. Absts. 4, Entry 480.

993. ARBER, AGNES. Studies on intrafascicular cambium in monocotyledons (III. and IV). Ann. Botany 33: 459-465. Fig. 1-7. 1919.—The occurrence of a cambium is recorded for the first time in members of the Juncaceae, Haemadoraceae, Amaryllidaceae, and Cyclanthaceae. A cambium has now been seen in nineteen families and in ten out of eleven cohorts of monocotyledons. In the eleventh cohort (Triuridales) cases are here described of an arrangement of the elements which may be interpreted as indicating cambial activity.—The structure of the leaf bundles of *Veratrum album* is described in some detail. In this species the cambium which is well developed appears in the summer, persists through the winter and functions in the succeeding year. There is a clear differentiation between the secondary xylem and the primary metaxylem, a condition which has been observed in a number of other monocotyledons. The xylem of the lateral veins is attached to the secondary xylem of the bundles from which they arise.—*W. P. Thompson*.

994. BAILEY, I. W. Depressed segments of oak stems. Bot. Gaz. 67: 433-441. 4 fig. 1919.—This paper is essentially a defense of the author's views against certain criticisms made in a recent paper by LANGDON (See Bot. Absts. 1, Entries 581, 1154). That the deeply depressed segments of young oak stems are correlated with the presence of pairs of approximated multiseriate rays rather than the stellate arrangement of the primary elements is indicated not only by a comparative study of the stems of various arborescent dicotyledons, but also by numerous facts in the anatomy of the genus *Quercus*. Exception is taken also to LANG-

DON's supposition of growth acceleration as a physiological explanation for the stellate form of the stele in young twigs.—*H. C. Cowles.*

995. DENIS, M. *Recherches anatomiques sur quelques plantes littorales de Madagascar.* [Anatomical studies of some shore plants of Madagascar.] *Rev. Gén. Bot.* 31: 35-52, 115-120, 129-142. *Pl. 1, fig. 1-12.* 1919.—A detailed study of the ecological anatomy of a number of plants of the seashore sands of the eastern coast of Madagascar. The climate is distinctly tropical, with abundant sunshine, with a high, nearly constant temperature, moderate rainfall, and constant high, dry winds; the soil is a dry, loose sand. Under these conditions the majority of plants are characterized by an almost complete lack of special epidermal protection, by a fleshiness of leaf and sometimes of stem (which is, however variable), by a general bifacial structure, and by well-developed water storage tissue. In these features, which are practically typical halophytic modifications, these Madagascar plants approach the halophytes of temperate regions.—*A. J. Eames.*

996. EVANS, ARTHUR T. *Embryo sac and embryo of Pentstemon secundiflorus.* *Bot. Gaz.* 67: 427-437. *1 pl.* 1919.—The embryo sac is developed from a single megaspore, the antipodals disorganizing early. The micropylar end becomes bulbous, the chalazal end long, narrow, and covered by a distinct tapetum. The mature embryo sac is constantly gorged with starch, due to the non-utilization of the nutritive materials which pass into the sac at a time of inactivity just before fertilization. The endosperm nucleus immediately divides and free nuclei migrate into the chalazal end of the sac, where wall formation begins. The proembryo is pushed into this endosperm by an extreme growth of the suspensor. The micropylar end of the sac disintegrates. Two haustoria are formed, the micropylar by the growth of endosperm cells from the chalazal end into the micropylar end, and the chalazal by the growth of endosperm cells from the chalazal end out into the vascular system. The cells of the latter haustorium are binucleate. False embryony occurs rather commonly.—*Arthur T. Evans.*

997. GATIN, VALENTINE-CHARLES. *Recherches anatomiques sur les variations du Paris quadrifolia L.* [Anatomical studies of *Paris quadrifolia L.* and its variations.] *Rev. Gén. Bot.* 31: 329-349, 353-371. *Fig. 1-21.* 1919.—The anatomy of the aerial stem, peduncle, and flower of normal and abnormal forms is described, attention being given particularly to the origin and course of the vascular bundles. The type with four leaves and a 4-merous flower is considered normal. In this the essential structure is as follows: In the stem three series of bundles persist without change from their points of origin at or near the rhizome to the whorl of leaves; the outer two series supply the leaves and form an outermost series in the peduncle. The innermost, or medullary, group becomes at the level of the leaves two concentric series which pass directly into the peduncle so that the structure of the latter is similar to that of the stem. Of the three series in the peduncle, the outermost is the sepal supply, the median, the petal supply, and the innermost that of the stamens and carpels. In number and arrangement of bundles the floral axis of *Paris* is thus different from that of the majority of the Liliaceae. Further, the vascular supply of the sepals, being derived from bundles distinctly foliar in nature, has an origin quite different from that of the petals, which have a cauline supply; and the supply of the stamens is derived independently of that of the petals, whereas the vascular supply of these two sets of organs often arises in common in the dicotyledons. From a comparison of forms with abnormal numbers of leaves and of floral parts with typical plants, it is found that the anatomical structure varies directly with external modifications. The 3-merous forms approximate *Trillium* in structure, the 5- and 6-merous, the Asiatic species of *Paris*. The author believes that there is evidence in this comparative study that a trimerous type has been transformed into a tetramerous, and then into pentamerous and hexamerous types; that this process is now going on; and that the tendency toward this change is spreading from the west to the east in the northern hemisphere.—*A. J. Eames.*

998. HARDY, A. D. *Teratological note. Pentamery in a flower of Narcissus.* *Proc. Roy. Soc. Victoria* 31 (N. S.), Part I: 7-8. 1918. [Received 1919.]—In *Narcissus tazetta* one bloom among many thousands examined simulated a dicotyledonous bloom. The normal floral

formula is $K3:C3:A3+3:G3$. Instead of showing arithmetical doubling the specimen discussed had the formula $K5:C5:A5+5:G5$. The size of the floral parts was normal but their numerical increase resulted in a conspicuously larger flower. The inter-antheral spaces were almost obliterated so that insect access would be difficult although cross pollination was possible. Only one previous record of an occurrence somewhat similar could be found although both irregular and rhythmic polyphyly have been recorded for *Narcissus*. Work of others on this subject is cited.—*Eloise Gerry*.

999. LINGELSHEIM, ALEXANDER. Über das Auftreten von Palisadenparenchym an der Unterseite bifacialer Blätter. [On the appearance of palisade tissue on the under side of bifacial leaves.] Ber. Deutsch. Bot. Ges. 36: 485-491. 1919.—Although very few instances of hypertrophy of the leaf lamina are on record, recent investigations show that they are found very frequently on leaves of *Corylus*, *Alnus*, and *Fagus*, especially in trees with the lacerate type of leaf structure. The abnormal leaf thickening is found near the margin and in the primary intercostal fields of the lamina, advancing in a wedge-like manner toward the midrib. In *Corylus Avellana* and *C. laciniata* this anomaly is a very common occurrence. Anatomically the thickening of the lamina is a hypertrophy, in that the spongy parenchyma has changed to palisade-like cells. Of interest also is the anatomical characteristic of the so-called short needles of *Tsuga* which are not only very small compared to the normal needles, but show a distinct iso-lateral leaf structure instead of the bi-facial structure common to the larger needles.—*Ernst Artschwager*.

1000. MOLISCH, HANS. Beiträge zur Mikrochemie der Pflanze. [Contribution to the micro-chemistry of plants.] Ber. Deutsch. Bot. Ges. 36: 474-481. 1919.—Giant silicious crystals are found in the leaf of *Arundo Donax* and are in size only second to the silica crystals found in the endocarp of *Phytelphas*. They can be readily observed by putting the leaf in phenol or macerating the tissue by chrom-sulphuric acid. Cystoliths have the ability to reduce silver nitrate and silver sulphate so strongly that they turn black in a very short time, owing to the calcium carbonate present in them. They are colored blue-violet with gold chloride, rose red with iron sulphate, pale green with nickel sulphate, pinkish or rose red with cobalt chloride and cobalt sulphate, owing to the precipitation of the hydroxide by the calcium carbonate present in the cystoliths.—*Ernst Artschwager*.

1001. MOXLEY, GEORGE L. Petalody of the stamens in *Eschscholtzia*. Bull. Southern California Acad. Sci. 18: 79. 1919.

1002. OSBORN, T. G. B. Some observations on the tuber of *Phylloglossum*. Ann. Botany 33: 485-516. Pl. 28, fig. 1-43. 1919.—*Phylloglossum Drummondii* grows in a region of South Australia subject to prolonged summer desiccation, and therefore characterized by a geophytic flora. The tuber is an efficient organ of perennation under these conditions. A single tuber is normally produced each year, not from the one of the previous season but from the stem of the plant some distance above the old one, and becomes buried by the growth of its stalk. Frequently also tubers are produced from leaves which have been injured or detached by accidental causes. (The results of many laboratory experiments on this form of regeneration are given.) There is first produced an adventitious "cell mass." On this a growing point appears which develops into a stalked tuber like that of the normal plant. The "cell mass" and the tuber are regarded as two distinct and independent structures, the former representing the protocorm of lycopods, and the latter a special adaptation in which *Phylloglossum* has improved upon the lycopod structure. The results of the investigation strongly emphasize the "biological" as opposed to the phylogenetic significance not only of this tuber but also of the protocorm of lycopods. The view that the tuber is morphologically a modified branch is not justified even on anatomical grounds. It is an adventitious growth of very great ecological value.—*W. P. Thompson*.

1003. PÉCHOUTRE, F. Revue de botanique. [Review of botany.] Rev. Gén. Sci. Pures et Appliquées 30: 242-250. 1919.—See Bot. Absts. 4, Entry 176.

1004. SCHULZ, A. *Lathyrus montanus* Bernh. mit verkümmertem Oberblatt. [*Lathyrus montanus* Bernh. with dwarfed blade and petiole.] Ber. Deutsch. Bot. Ges. 36: 572-574. 1918.—The plant examined has normally developed stipules but much reduced leaves. Not only the leaf blade but the petiole as well is dwarfed, attaining only half the size of the stipules. Apparently there is a growth correlation between stipules and leaves; at least similar anomalous structures have been reported by Goebel and others who found that a reduction in the size of the foliage leaves is accompanied by an increased development of the stipules. In this case, however, the stipules remained normal as to size.—*Ernst Artschwager*.

1005. SINNOTT, E. W. Size variation in secondary xylem. [Rev. of: BAILEY, I. W., and W. W. TUPPER. Size variation in tracheary cells. I. A comparison between the secondary xylems of vascular cryptogams, gymnosperms, and angiosperms. Proc. Amer. Acad. Arts and Sci. 53: 149-204. 6 fig. 1918.] Bot. Gaz. 67: 374. 1919.—See Bot. Absts. 1, Entries 584, 998.

1006. WORSDELL, W. C. The origin and meaning of medullary (intraxylary) phloem in the stems of dicotyledons. II. Compositae. Ann. Botany 33: 421-458. Fig. 1-27. 1919.—The author's theory that the "internal-phloem" strands constitute an inner series of bundles belonging to a fundamentally monocotyledonous type of vascular system is here applied to the Compositae in particular and in general to most of the other orders of dicotyledons. The vascular conditions in a large number of species belonging to many genera of Compositae are described and may be summarized as follows: (1) The main vascular cylinder of the stem is loosely constituted and the bundles are irregularly alined in the vascular ring; (2) The occurrence of the medullary strands is highly variable; within the same genus they are present in the stem of some species and absent in others; within the same species they are present in some individuals and absent in others; in many cases they are completely absent or very rudimentary in the stem but conspicuously present in the leaf; in many genera they are entirely absent in all regions; (3) The degree of development of the medullary strands is also variable; some are throughout well developed vascular bundles, some consist of phloem only, while some exhibit both phloem and xylem in part of their course and in another part phloem only; (4) In regard to the course (downwards) of the strands, some arise from flowers, some from the vascular ring of the main stem, some from lateral branches and some *de novo* in the pith; they may branch, fuse with one another or the main vascular ring, or die out *in situ*.—From these and other facts the author draws the following conclusions: (1) The intraxylary phloem of Compositae is a vestige of a formerly well developed system of medullary bundles; (2) These bundles together with those of the vascular ring constituted a scattered, monocotyledonous type of vascular system; (3) This monocotyledonous system was a normal feature not only of this order, or its ancestors, but also of many other dicotyledonous orders; (4) The conservative foliar organs often retain the ancestral condition when it has become extinct or nearly so in the stem; (5) The Compositae as well as most other dicotyledonous natural orders have been derived from a monocotyledonous stock of geophytic habit.—*W. P. Thompson*.

1007. YOUNGKEN, HEBER W. Notes on the dasheen and chayote. Amer. Jour. Bot. 6: 380-386. Fig. 1-5. 1919.—See Bot. Absts. 4, Entry 976.

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*

1008. ALLEN, E. J. A contribution to the quantitative study of Plankton. Jour. Marine Biol. Assoc. United Kingdom 12: 1-8. 1919.—Briefly reviews the published work of others and describes the application of the centrifuge and culture method, familiar to bacteriologists, to the study of the diatoms, flagellates, etc. of the sea. By this means the author found 464 organisms, exclusive of bacteria, per cc. of sea-water, and concludes, since not all sea-organisms will grow in the culture media employed, that the number present was probably nearer 1,000 per cc.—*G. J. Peirce*.

1009. ANONYMOUS. [Rev. of: CHURCH, A. H. The building of an autotrophic flagellate. Bot. Mem. no. 1. 27 p. Oxford Univ. Press. 1919.] Jour. Botany 57: 288-290. 1919.

1010. ANONYMOUS. [Rev. of: YENDO, K. A monograph of the Genus *Alaria*. Jour. Coll. Sci. Imp. Univ. Tokyo. 43: 145 p. 19 pl. 1919.] Jour. Botany 57: 290-291. 1919.

1011. ANONYMOUS. Travaux recents sur les thallophytes. [Recent work on the thallophytes.] Ann. Sci. Nat. Bot. X, 1: xxx. 1919.—One of most important discoveries in this field is that of Sauvageau on *Laminarias*. Until recently only zoosporangia were known, forming on median line of limb; Williams observed that zoospores gave a filament (indicating protonema in evolution of *Laminarias*); Drew saw certain cells of filament emit bodies. Sauvageau believes he has established that in *Laminarias* two kinds of filaments arise from zoospores, male and female. These filamentous sexual thalli are very small. Observation of actual fusion of gametes and development from gametospore not yet observed. [This article given only in part in this number.]—J. P. Kelly.

1012. CHAMBERLAIN, C. J. Alternation of generations in *Padina*. [Rev. of: WOLFE, J. J. Alternation and parthenogenesis in *Padina*. Jour. Elisha Mitchell Sci. Soc. 34: 78-109. 1918.] Bot. Gaz. 67: 278. 1919.—The reviewer hopes that the author will investigate the chromosome numbers, especially in the parthenogenetic plants. [See Bot. Absts. 1, Entry 983.]—H. C. Cowles.

1013. CHURCH, A. H. Historical review of the *Phaeophyceae*. Jour. Botany 57: 265-273. 1919.—The paper is made up of notes summarizing the progressive discovery of this remarkable race of Marine Algae. The subject falls into five epochs:

- I. Theophrastus to the Herbalists (300 B. C.-1622 A. D.).
- II. Early Systematists (Bauhin 1620 to Dillenius 1724).
- III. Influence of the Linnaean System (1735-1813).
- IV. Influence of the Natural System (1789-1851).
- V. Modern Botany.

Theophrastus recorded but few algae. The term "*Phycos*" was originally used to cover all marine plants. The term *Fucus* was used by the Romans for the *Roccella*-lichen. The first real step was made by Dodonaeus in 1616. He figured creditably four forms, but called *Fucus vesiculosus*, *F. primus* as being the "*Quercus marina*" of Theophrastus. Among the early systematists, Bauhin noted 20 forms: Parkinson knew 12 English forms and Tournefort listed 76 species. Dillenius, in the third edition of Ray's Synopsis (1724), included 57 species under *Fucus*. Under Linnaeus there was a considerable advance, though Linnaeus knew little of the sea at first hand. Twenty-seven species of *Fucus* and several other genera of algae were recognized by Linnaeus. From this time on the addition of forms and descriptions proceeded steadily. Meanwhile new scientific methods were introduced. Little advance was made, however, beyond what could be seen with a low-powered hand lens. Natural orders among the brown algae were first mapped out by Lamouroux (1813), who also segregated numerous genera. From this time on the creation of new genera progressed rapidly. Lyngbye (1819) noted 49 genera. Agardh (1824) presented another distinct advance, listing 6 orders and 70 genera. The golden age of the collector and systematist ended with the younger Agardh (1848) and Kützting (1843), the latter's work being a distinct transition to modern methods. Kützting was the first to introduce the present laboratory practice of section-cutting, staining, etc.

With the beginning of the modern era, comparative morphology was born, and conceptions of evolution began to appear. Contributions to our knowledge of the brown algae were made by Bornet, Thuret, Janckewski, Guignard, Berthold, Reinke, Oltmanns, and others. The latest official review of this group is that of Kjellman (1891): The most complete systematic text is that of De Toni (1895): and the most complete text-book is that of Oltmanns (1904-15). Morphology of the brown algae has been best dealt with by Reinke and Oltmanns; while Kuckuck has set the highest standard of draughtsmanship for cells and tissues. The opening years of the present century show progress along the ecological side.—K. M. Wiegand.

1014. CHURCH, A. H. Historical review of the Florideae.—I. Jour. Botany 57: 297-304. 1919.—The history of the Florideae is in its early stage bound up with that of other marine plants, as outlined in the author's previous paper (Jour. Bot. 57: 265. 1919) on the history of the Phaeophyceae.—The separation of the group under this special name was made by Lamouroux (1813). Eleven genera were treated by him under this head. Color was largely used as a distinguishing feature and thus the separations were not wholly natural. A list is given of the principal contributors and the genera later named after them. Of the early collectors Kützinger (1843) alone incorporated some details of modern morphology and physiology, thus exhibiting a transition to the modern era. Beyond what may be termed the bookkeeping of the subject, the great advances in our knowledge especially of life histories, are due to relatively few workers. In this connection certain papers stand out as marking epochs. (1) Researches of Bornet and Thuret (1867) on sexual reproduction, significance of sexuality, and the nature of the reproductive organs. Very accurate and beautiful aquatint plates by Riocreux accompanied this work. (2) Researches of Schmitz (1883) dealing especially with the cystocarp and the nature of the cell-fusions, and with a regrouping of families and genera in accordance with the nature of these reproductive phenomena. Schmitz attempted to establish a double fertilization which has not been sustained by later work, but his classification is the basis of the one now in use. (3) Researches of Oltmanns (1898) who succeeded in explaining the nature of the secondary fusions. These peculiar phenomena were explained as solely an attempt to obtain food-supplies for the parasitic generation. (4) Researches of Yamanouchi (1906) which stand as a model of careful work on the cytology of reproduction in this group. The cytological relations of the different individuals in the trimorphic sequence in the life-cycle were clearly established by him. More recently Svedelius, Kylin and Cleland have shown that the haploid and diploid nuclear phases may not conform to the morphological alternation of gametophyte and sporophyte, which may aid in freeing botany from the curious obsession, dating from Strasburger, that cytological phenomena can be a causal factor in the differentiation of the life cycle. (5) Within the present generation the Florideae share in the new outlook under the heading ecology.—K. M. Wiegand.

1015. CHURCH, A. H. The plankton-phase and plankton-rate. Jour. Bot. 57: Supplem. III. 1-8. 1919.—See Bot. Absts. 4, Entry 182.

1016. CLELAND, RALPH E. The cytology and life-history of *Nemalion multifidum*, Ag. Ann. Botany 33: 323-351. Pl. 22-24, 3 fig. 1919.—Author finds a true pyrenoid in the center of the radiating chromatophore, its prominence being directly proportionate to its opportunities for photosynthetic activity. The substance of the pyrenoid breaks down readily under inferior fixation but is well preserved and stains deeply after fixation with chromosmo-acetic acid. The product of photosynthesis is a soluble "Floridean starch" which lies diffused throughout the cytoplasm of the cell and stains wine red to violet with iodine.—When the spermatium escapes from the antheridium its nucleus is in prophase of mitosis and this division is completed after its attachment to the trichogyne. The spermatium therefore becomes binucleate and is the homologue of an antheridium. Several male nuclei may pass into the trichogyne but only one enters the carpogonium. A trichogyne nucleus is only occasionally formed and, when present, quickly breaks down, the fusion of gamete nuclei involves a fusion of chromatic nucleoles. The first mitosis of the zygote nucleus takes place at once and is a reduction division. During early prophase of this mitosis a delicate reticulum is formed the threads of which take on a parallel arrangement, apparently fusing, thickening, shorten and thus by condensation form 8 bivalent chromosomes. These are later differentiated as eight pairs of chromosomes distributed about the nuclear cavity in a clear stage of diakinesis. The 16 chromosomes of this diploid group are therefore segregated at once by this reduction division in the zygote. Following the reduction division in the fertilized carpogonium, a cell is cut off below containing one of the two daughter nuclei and there is occasionally a mitosis in this cell, but this is the nearest approach to the formation of a tetrad group such as is reported in *Scinaia*. The haploid chromosome number, eight, is present in all

later mitoses in the cystocarp and at other points in the life history. The resting nucleus contains a large nucleole and a reticulum of delicate threads. Approaching mitosis is indicated by the appearance, where the threads cross, of numerous granules which are brought together by the contraction of the threads, fusing successively until the eight chromosomes are differentiated. The spindle is intranuclear and conspicuous polar structures are present. The nucleole during metaphase takes a position outside of the spindle and disappears with the breaking down of the nuclear membrane. Each set of daughter chromosomes during telophase organizes a chromatic nucleole from which material is later distributed as a network throughout the resting nucleus. The carpospore germinates at once and the first mitosis presents no peculiarities of special importance. A nucleus is left in the basal cyst and this may divide again but the resulting nuclei do not become completely organized and soon break down. Since reduction, as in *Scinaia* and *Coleochaete*, takes place with the first mitosis of the zygote nucleus, the cystocarp of *Nemalion* is not sporophytic in character, and there is no cytological alternation of generations in this plant.—*B. M. Davis.*

1017. COLLINS, FRANK S. The green algae of North America. Second supplementary paper. Tufts Coll. Studies Sci. Ser. 47: 1-106. Pl. 1-3. 1918.—Includes species, etc., added to the flora of North America since the publication of the first supplementary list in 1912. A general notice of discoveries and publications during the six years is followed by description and citations for the species and varieties. For genera where a considerable number of species are recorded for the first time for America, revised keys are given, covering all species of the first flora and both supplements; e.g., *Spirogyra* and *Oedogonium*. An alphabetical list is given of all works cited, not included in similar lists in the flora and first supplement. New are *Oedocladium albemarlense* I. F. Lewis. *Cladophora hemisphaerica* N. L. Gardner. *C. Rudolphiana* forma *eramosa* N. L. Gardner. New combinations are *Lagerheimia citriformis* (Snow) Collins. *L. ciliate* var. *minor* (G. M. Smith) Collins. *Scenedesmus longus* var. *Naegelii* (Bréb.) G. M. Smith. *Geminella scalariformis* G. S. West.—*Frank S. Collins.*

1018. COLLINS, F. S. Chinese marine algae. *Rhodora* 21:203-207. 1919.—A list of specimens identified by the writer from a small collection of marine algae gathered by Mrs. Spencer Lewis in 1915 at Pei Tai Ho, Gulf of Pechili, Chihli Province, China. Also a brief summary of the previous knowledge of Chinese marine algae and a general list of those mentioned in the works cited, which seem to be authentic.—*James P. Poole.*

1019. COLLINS, FRANK S. A working key to the genera of North American Algae. Tufts Coll. Studies Sci. Ser. 48: 1-50. 1919.—4 pages of explanation followed by a binomial key covering all genera of algae, excepting diatoms, known to occur in North America, from the Arctic Ocean to the Isthmus of Panama. Habit, structural and distributional characters are utilized. A glossary gives definitions of all technical terms.—*Frank S. Collins.*

1020. CORTI, EGIDIO. Gli abitatori di un peduncolo floreale di Ninfea. [The inhabitants of a peduncle of *Nymphaea*.] *Nuova Notarisia* 1919: 63-66. 1919.—A list of organisms occurring on a flower stalk of *Nymphaea* from Lake Segrino in Italy, 67 species of algae and 7 species of animals are listed.—*Frank S. Collins.*

1021. GROVES, C., AND G. R. BULLOCK-WEBSTER. New variety of *Tolypella glomerata*. *Jour. Botany* 57: 224-225. 1919.—*T. glomerata* var. *erythrocarpa* from the British Isles is described as new. The localities given are: Anglesey, Llyn Coron; Leitrim, Lough Melvin; and E. Donegal, L. Magheradrumman. The oöspore is more rounded and redder in color than in the typical form of the species.—*K. M. Wiegand.*

1022. HITCHCOCK, R. Preliminary note on the differential staining of the cytoplasm of Characeae. *Bull. Torrey Bot. Club* 46: 375-379. 1919.—By using neutral red in dilute solution "the cell contents of a *Chara* plant may be differentially stained while the plant is living" and various layers and parts in the cell become very evident. In *Nitella* cells peculiar plasmic structures become visible which are plastic and granular and contain many small disks.—*P. A. Munz.*

1023. KOLWITZ, R. Plankton und Seston II. [Plankton and Seston II.] Ber. Deutsch. Bot. Ges. 36: 574-577. 1918.—This is a continuation of investigations reported in Vol. 30 of the same publication. The word "Seston" is used to designate the summation of all bodies suspended in water, both animate and inanimate. This includes the very fine detritus which in some waters is of great importance as food for *Bosmina*. Forms like *Cryptomonas*, *Hydatina* and *Daphnia* consume large quantities of bacteria and other minute plants thereby checking the development of the latter. In clear waters and the sea, the vegetative plankton decreases considerably and at the same time the fine detritus becomes less. In such cases the inanimate part of the seston attains great importance.—*Ernst Artschwager*.

1024. MAZZA, ANGELO. Aggiunte al saggio di algologia oceanica. [Appendix to the essay on oceanic algology.] Nuova Notarisia 1919: 1-62. 1919.—Gives descriptions, citations and general discussion of the following species, not mentioned in their appropriate place in the series of notes by the author on the same subject in Nuova Notarisia from 1905 to 1918. *Conchocelis rosea*, *Trichogloea lubrica*, *Nemalion vermiculare*, *Helminthora divaricata*, *H. tumens*, *Dermonea dichotomum*, *Scinaia furcellata* var. *australis*, *S.?* *silicornioides*, *Brachycladia marginata*, *Galaxaura infirma*, *G. lapidescens*, *Actinotrichia rigida*, *Chaetangium variolosum*, *Wrangelia tenella*, *W. Halurus*, *W. clarigera*, *W. setigera*, *Atractophora hypnoides*, *Naccaria Wiggihii*, *Gelidium asperum*, *G. lingulatum*, *Porphyroglossum Zollingeri*.—*Frank S. Collins*.

1025. MOLA, PASQUALE. Flora delle acque Sarde. Contributo delle Piante idrofite ed igrofite della Sardegna. [Flora of the Sardinian waters. Hydrophytes and hygrophytes of Sardinia.] Atti R. Acad. Sci. Torino 54: 478-502. 1918-1919.—The first part of the paper deals with the ecological factors of the places explored, showing the influence of altitude; chemical composition, source and rapidity of flow of water; different soil water levels and wind in producing the vegetation characteristic of the area under consideration: an aquatic formation rich in hydrophytes and hygrophytes. The second part is a catalog of the orders and species of both cryptogams and phanerogams, the habitat of each species being noted.—*Harriet M. Libby*.

1026. MOREAU, F., AND MME. F. MOREAU. Recherches sur les lichens de la famille des Peltigéracées. [Researches on the lichens of the family Peltigeraceae.] Ann. Sci. Nat. Bot. X. 1: 29-32. 1919.—See Bot. Absts. 4, Entry 1130.

1027. NORDSTEDT. Australasian Characeae. Proc. Roy. Soc. Victoria N. S. 31: 1-6. 1918. [Received 1919].—A synopsis or key prepared for private use but felt to be of value particularly to Australian students is given.—*Eloise Gerry*.

1028. PRINGSHEIM, ERNST G. Die Kultur der Desmidiaceen. [The culture of Desmidiaceae.] Ber. Deutsch. Bot. Ges. 36: 482-485. 1919.—See Bot. Absts. 4, Entry 1545.

1029. RIDLEY, H. N. The fern-allies and Characeae of the Malay Peninsula. Jour. Roy Asiatic Soc. Straits Branch 80: 139-164. 1919.

1030. THURSTON, H. W., JR. Sex in the conjugatae and the relative frequency of the different types of conjugation. Bull. Torrey Bot. Club 46: 441-446. 1919.—A review is given of opinions expressed in the literature on the question of true sexual differentiation between the cells that fuse in zygospore formation in filamentous Conjugatae.—*P. A. Munz*.

1031. YENDO, KICHISABURO. The germination and development of some marine algae. II. Bot. Mag. Tokyo 33: 171-184. Pl. 2. Sept., 1919.—This paper describes the germination of the zoospores (of *Phyllitis*) to form gametophytic filaments. Antheridia are single enlarged oval cells in the filament and contain a large number of very small motile sperms. The author was unable to determine the number of cilia or the detailed structure. They escape through a lateral pore at the end of a short conical tube-like protrusion. The oogonia arise through the lateral outgrowth of an intercalary cell which becomes separated by a wall,

rounds up, and finally is detached. Fertilization was not observed but the oospores were observed to germinate and their growth followed for several weeks until the cultures were lost through decay. At that time the filaments had reached the 3-celled stage.—*L. I. Burlingame.*

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

1032. AMANN, J., AND C. MEYLAN. *Flore des mousses de la Suisse.* [Moss flora of Switzerland.] v. 1, 215 p., v. 2, 5 + 414 p. Pl. 1-12. L'Herbier Boissier: Geneva, 1918.—In the second part the collaboration of P. Culmann is also acknowledged. Both parts bear the separate date of 1912 and indicate Lausanne as the intended place of publication. The work represents the first attempt at a comprehensive treatment of the mosses of Switzerland since the appearance of Lesquereux's *Catalogue des mousses de la Suisse* in 1845. The first part, aside from introductory suggestions for the study of mosses, is devoted to an original combination of keys and descriptions for the identification of the Swiss mosses; it includes in fact most of the species that have been proposed from all parts of Europe. Although in certain groups supplementary keys are given in the second part, this is primarily a "Bryogéographie," giving complete lists of localities of the Swiss species so far as known and including the other European species in finer print with a general statement of the regions where they are known to occur. Subspecies are designated as species of the second rank, a few species of the third rank are likewise included, and a multitude of varietal forms are recognized. Notes are often added calling attention to intergrading forms between species or to other observations and opinions of the senior author or his collaborators. The following apparently new species names are offered, the author in each case being Amann, unless otherwise noted: *Bryum albulanum*, *B. Baurii*, *B. callicarpum*, *B. Colombi* Meylan, *B. gypsophilum*, *B. jamanense* (reduced on a later page to a synonym of *B. inflatum* Phil.), *B. juranum*, *B. microcaespitium*, *B. microlacustre* (replacing *B. parvulum* Amann of an earlier page), *B. oeneiforme* (on a later page apparently identified with *B. Dixoni* Card.), *B. pallidocuspdatum*, *B. pseudo-Graefianum*, *B. purpureo-aristatum*, *B. rosulatum* (not C. Mull., 1856), *B. Ruedianum*, *B. scoticum*, *B. valesiacum*, *Ceratodon crassinervis* (not Lorentz, 1866), *Dicranoweisia intermedia*, *Dicranum latifolium* (not Hedw., 1787), *Eurhynchium nivium*, *Ptychodium trisulcatum*, *Schistidium papillosum* Culmann, *Syntricia spuria* and *Trichostomum Fleischeri* Bauer. The first two plates deal with general matters helpful to moss-students; the others illustrate species or forms which are new or not well understood.—*A. LeRoy Andrews.*

1033. BROWN, MABEL MARY. The development of the gametophyte and the distribution of sexual characters in *Funaria hygrometrica* (L.) Schreb. Amer. Jour. Bot. 6: 387-400. Pl. 36. 1919.—Spores sown on the surface of Marchal's solution produced protonemata which were transferred singly by a needle to the surface of sterilized soil in pots. The resulting single-spore cultures have been under observation for 2 years, and still remain uncontaminated by other mosses. Leafy axes are produced about eight weeks after germination, and the first antheridia appear 4 to 6 weeks later. This species is strictly monoecious, the spores, protonemata, and gametophores being bisexual in their potentialities. Synoicous inflorescences occur on about 14 per cent of the gametophores. Antheridia always appear before archegonia, and are typically produced on the apex of the primary axis of the gametophore, with the archegonia on lateral innovations. Other arrangements often occur.—*G. S. Torrey.*

1034. CAMPBELL, DOUGLAS HOUGHTON. The structure and development of mosses and ferns. 3d ed. 8 vo. 708 p. Macmillan Co.: New York, 1918.—See Bot. Absts. 3, Entry 690.

1035. DOUIN, CH. *Recherches des Cephaloziella.* [Quest of the Cephaloziellas.] Rev. Bryologique 41: 83-84. 1911. [Issued in 1919].—Suggestive notes are given regarding the external conditions under which the various species of *Cephaloziella* attain their best develop-

ment. Most of them require a considerable amount of light and prefer a relatively low humidity. In temperate regions they are in their most luxuriant condition during the months of October and November.—A. W. Evans.

1036. EVANS, ALEXANDER W. Three South American species of *Asterella*. Bull. Torrey Bot. Club 46: 469-480. 1919.—*Asterella chilensis* (Mont.) comb. nov., *A. macropoda* (Spruce) comb. nov., and *A. boliviana* (Steph.) comb. nov. are the species discussed.—P. A. Munz.

1037. GRAHAM, MARGARET. Centrosomes in fertilization stages of *Preissia quadrata* (Scop.), Nees. Ann. Botany 32: 415-420. Pl. 10. 1918.—The occurrence of centrosomes and asters is demonstrated in the egg cell of *Preissia quadrata* after the entrance of the antherozoid but before the fusion of the male and female nuclei. The centrosomes occur at the opposite poles of the female nucleus and the astral rays, which are not numerous, converge upon the centrosomes. Similar centrosomes and asters are shown also in the cells of the young sporophyte.—A. W. Evans.

1038. GRAHAM, MARGARET. Centrosomes during early fertilization stages in *Preissia quadrata*. Mem. Torrey Bot. Club 17: 323-325. Pl. 8. 1918.—See Bot. Absts. 2, Entry 79; also preceding Entry, 1037.

1039. MOTTIER, D. M. Chondriosomes and the primordia of chloroplasts and leucoplasts. Ann. Botany 32: 91-114. Pl. 1. 1918.—See Bot. Absts. 2, Entry 81; 4, Entry 686.

1040. NEGAI, ISABURO. Induced adventitious growth in the gemmae of *Marchantia*. Bot. Mag. Tokyo 33: 99-109. Figs. 1-5. 1919.—See Bot. Absts. 3, Entry 2902.

1041. THÉRIOT, I. Mousses de l'Annam. [Mosses of Anam.] Recueil Publ. Soc. Havraise d'Étud. Diverses 1919: 33-47. Pl. 1, 2. 1919.—The present paper is based on a collection made in 1912 by A. KREMPF along the southern coast of Anam. Of the 28 species enumerated 13 are known also from the Sunda Islands. The following are proposed as new and figured on the two plates: *Ectropothecium annamense*, *Homaliodendron crassinervium*, *Leucobryum Krempfii*, *Leucoloma annamense*, *L. Krempfii*, *Neckeropsis Krempfii* and *Pinnatella* (?) *corrugata* Cardot & Thériot.—A. W. Evans.

1042. THÉRIOT, I. Contribution a la flore byrologique du Chili. [Contribution to the bryological flora of Chile.] Rev. Chilena Hist. Nat. 22: 79-92. Pl. 5, 6. 1918.—This is the third article published by the author under the above title. It is based on a collection of mosses made by JOSÉ A. CAMPO in the vicinity of Victoria, Chile. Thirty-seven species and varieties are enumerated with citation of specimens and many critical observations are included. The following species are described as new: *Campylopus Campoanus*, *C. carbonicolus*, *Tortula obscuriretis*, *Stereodon Campoanus*, and *Eurhynchium confusum*. These, together with *Rigodium mano-fasciculatum* C. Müll., are figured on the plates.—A. W. Evans.

1043. WATSON, W. The bryophytes and lichens of calcareous soil. Jour. Ecol. 6: 189-198. 1918.—See Bot. Absts. 4, Entry 309.

1044. WHELDON, J. A. Notes on Braithwaite's Sphagnaceae exsiccatae. Jour. Botany 57: 142-147. 1919.—These exsiccatae were issued while Braithwaite's work, the "Sphagnaceae or Peat Mosses of Europe and America," was in preparation, and the set under consideration was dated April, 1877. The present author believes that the various sets were not all alike and notes the fact that very few of the specimens were collected by Braithwaite himself. One of the numbers, issued under the name *S. subsecundum* var. *contortum*, proves to be a form of *S. bavaricum* Warnst., thus confirming BELLERBY's record of that species. At the conclusion of the paper a list of the specimens in the exsiccatae is given, named according to Wheldon's Synopsis of European Sphagna. Fifty-two numbers are included, with notes and synonymy under each.—K. M. Wiegand.

1045. WOODBURN, WILLIAM L. Preliminary notes on the embryology of *Reboulia hemisphaerica*. Bull. Torrey Bot. Club 46: 461-464. Pl. 19. 1919.—Some observations are made on the behavior of the sperm nucleus in early stages of fusion. The earliest divisions of the zygote are transverse and may form a tier of four cells, or may be more irregular. The hypobasal cell evidently forms the foot, and the epibasal the stalk and the capsule.—P. A. Munz.

MORPHOLOGY AND TAXONOMY OF FUNGI, BACTERIA AND MYXOMYCETES

E. W. OLIVE, *Editor*

H. M. FITZPATRICK, *Assistant Editor*

1046. ANONYMOUS. *Botrytis*. Kew Bull. Misc. Inf. [London] 1919: 93. 1919.

1047. ANONYMOUS [B. O. DODGE.] Index to American mycological literature. Mycologia 11: 284-287, 323-326. 1919.

1048. ANONYMOUS. Onion diseases. Kew Bull. Misc. Inf. [London] 1919: 92. 1919.—See Bot. Absts. 3, Entry 2546.

1049. ANONYMOUS. Potato disease. Kew Bull. Misc. Inf. [London] 1919: 94. 1919.—See Bot. Absts. 3, Entry 2545.

1050. ANONYMOUS. Fungi from Singapore and also from Penang. "Fungi Singaporensis Bakeriani." Gardens' Bull. Straits Settlements 2: 116-120. 1919.—An enumeration of eighty-nine fungi collected by C. F. BAKER during his service with the Government of the Straits Settlements, and enumerated by Saccardo in the "Bulletino del Orto Botanico Reale di Napoli, vol. VI (1918)."—S. F. Trelease.

1051. ANONYMOUS. *Echinodia theobromae*, Pat. [English translation from French.] Gardens' Bull. Straits Settlement 2: 144-145. 1919.—English translation of a description of *Echinodia theobromae* Pat. by N. PATOULLARD in the "Bulletin de la Societe Mycologique de France, 34: 2nd Fascicle."—S. F. Trelease.

1052. ANONYMOUS. [REV. OF: SÉE, PIERRE. *La florule du papier. Étude systématique et biologique des champignons chromogènes du papier piqué. Nature, origine, agents et remèdes de l'alteration des papiers. (The flora on paper. Systematic and biologic study of the chromogenic fungi on spotted paper. Nature, origin of these fungi, their action in changing the paper and remedies to prevent their growth.)* Thesis presented for the degree of doctor of natural sciences. Pamphlet, 168 p., 17 pl. Paris, 1919.] Jour. de Pharm. et de Chim. 20: 99-100, 1919.—The author found amongst perfect fungi *Chaetomium*, *Myxothrichum*, etc., amongst fertile filamentary forms *Stachybotrys* and *Aspergillus* and a sterile *Fusarium*, and amongst fumagoid forms *Alternaria* and *Stemphylium*.—H. Englehardt.

1053. ARTHUR, J. C., AND E. B. MAINS. Grass rusts of unusual structure. Bull. Torrey Bot. Club 46: 411-415. Fig. 1-2. 1919.—Leaves of the species of *Olyra* of the Paniceae resemble very closely those of certain bamboos, although the two are not related. The rusts on these genera have also been confused and in this paper, a comparison is drawn between three tropical rusts: *Puccinia pallescens* on *Tripsacum*, *Puccinia phakopsoroides* on *Olyra*, and *Uredo ignava* on *Bambos*. *Puccinia phakopsoroides* is described as a new species.—P. A. Munz.

1054. BAKER, C. F. *Hevea* versus fungi. Gardens' Bull. Straits Settlements 2: 109-113. 1919.—See Bot. Absts. 4, Entry 1235.

1055. BATAILLE, F. Decouverti en France d'une nouvelle station du *Phallus impudicus*, var. *imperialis* (Schulz) Lloid. [The discovery of a new place for *Phallus impudicus*, var. *imperialis* in France.] Bull. Trimest. Soc. Mycolog. France 34: 195-197. 1919.—The author mentions that *Phallus impudicus*, var. *imperialis*, a rare variety, was collected in 1915 on the battlefield of Champagne, France.—Fred C. Werkenthin.

1056. BEAUVERIE, J. [Rev. of: VINCENS, F. Recherches organogéniques sur quelques Hypocréales. (Organogenic researches on Hypocreales.) Thèse Fac. Sci. Paris. 170 p. Pl. 3, fig. 71. 1917.] Rev. Gén. Bot. 31: 122-125. 1919.

1057. BOAS. [Rev. of: DIETEL, P. Ueber einige neue oder bemerkenswerte Arten von Puccinia. (New and interesting species of Puccinia.) Ann. Mycolog. 15: 492-494. 1917.] Zeitschr. Pflanzenkrankh. 29: 63. 1919.

1058. BOAS. [Rev. of: NEGER, F. W. Experimentelle Untersuchungen über Russtaupilze. (Experimental studies of sooty fungi.) Flora 10: 67-139. 1917.] Zeitschr. Pflanzenkrankh. 29: 64-65. 1919.—Author discusses fungi causing sooty coverings, generally referred to as *Capnodium* and *Fumago*. In reality this deposit is a mixture of more or less numerous species living upon honeydew covered leaves. Most general are:—*Dematium pullulans*, *Cladosporium herbarum*, *Penicillium* spp., *Botrytis cinerea*, yeasts, and bacteria. [See Bot. Absts. 1, Entry 1667.]—H. T. Güssow.

1059. BOAS. [Rev. of: WARTENWEILER, H. Beiträge zur Kenntnis der Gattung Plasmopara. [On the genus Plasmopara.] Ann. Mycolog. 15: 495-497. 1917.] Zeitschr. Pflanzenkrankh. 29: 62. 1919.

1060. BOTTOMLEY, AVERIL MAUD. A preliminary investigation into a disease attacking young Cupressus plants. South African Jour. Sci. 15: 613-617. Pl. 18-21. 1919.—See Bot. Absts. 4, Entry 1244.

1061. BRIERLY, W. B. Some concepts in mycology—an attempt at synthesis. Trans. British Mycol. Soc. 6: 204-235. 1919.—The author points out that many concepts in biology fail to correspond to reality. The species concept is one of these. He then at considerable length discusses the undesirability of following the methods of the older school of systematists in attempting to delimit species on morphological characters. Another questionable concept called to attention is termed the "educability of fungi." In this connection doubt is expressed concerning the possibility of changing the inherent characters of organisms under control conditions. The paper is fundamental in its application to the study of the fungi and much literature bearing on the general subject is cited. It will prove of interest to students who are concerned with biological species, with the growing of fungi on differential media, with the phenomenon of facultative parasitism, and other kindred matters.—H. M. Fitzpatrick.

1062. BRIOSI, G., AND R. FARNETI. La moria dei Castagni (mal dell' inchiostro.) [Black canker of chestnut.] Atti Ist. Bot. Univ. Pavia 2, 15: 43-51. Fig. 1-2. 1918.—See Bot. Absts. 3, Entry 2579.

1063. BUDER, J. Zur Biologie des Bakteriopurpurins und der Purpurbakterien. [Contribution to the biology of the purple bacteria and their pigments.] Jahrb. Wiss. Bot. 58: 525-628. Pl. 5, fig. 1-5. 1919.—See Bot. Absts. 4, Entry 1429.

1064. BURT, E. A. *Merulius* in North America, supplementary notes. Ann. Missouri Bot. Gard. 6: 143-145. 1919.—*Merulius rubellus*, regarded as a synonym of *M. incarnatus* Schw. in Burt's work on "*Merulius* in North America," is a good species and should take the place of *M. incarnatus* in the key to species in that paper. *Merulius incarnatus* "is the common species with snow-white effuso-reflexed pileus, garnet-colored hymenium, large decompound pores, and small allantoid spores, of the eastern United States," and probably should as hith-

erto, be referred as a form of *M. tremellosus*. Further specimens of *M. hirsutus*, *M. lacrymans* and *M. rimosus* are cited.—S. M. Zeller.

1065. BURT, E. A. An edible garden Hebeloma. Ann. Missouri Bot. Gard. 6: 171-174. Pl. 3. 1919.—*Hebeloma hortense*, reported as a palatable and delicious mushroom, is described as new.—S. M. Zeller.

1066. BURT, E. A. Protomerulius Farlowii Burt, n. sp. Ann. Missouri Bot. Gard. 6: 175-177. 1 fig. 1919.

1067. CARPENTER, C. W. Report of the division of plant pathology. Hawaii Agric. Exp. Sta. Rept. 1918: 10, 35-45. Pl. 8-10. 1919.—See Bot. Absts. 3, Entry 2593.

1068. CHENANTAIS, J.-E. Études sur les Pyrénomycètes (Suite) (1). [A study of the Pyrenomycetes. (Cont.) (1).] Bull. Trimest. Soc. Mycolog. France 34: 123-136. Fig. 1-2. 1919.—The author discusses the genus *Lophiotrema*.—Fred C. Werkenthin.

1069. CHENANTAIS, J.-E. Études sur les Pyrénomycètes (Suite et fin). [A study of the Pyrenomycetes (Continuation and end).] Bull. Trimest. Soc. Mycolog. France 35: 113-139. Pl. 1-6, fig. 1-10. 1919.—This discussion of the Pyrenomycetes gives a list of new forms and new varieties as follows: *Zignoella insueta* Chen. n. form; *Pseudovalsa macrosperma fenestrata* (Tul.) n. var.; *Schizostoma byssisedum* Flag. et Chen. n. form; *Saccardoella Montellica Rubi* (Speg.) Chen. n. form; *Neopeckia anceps* Chen. n. form; *Didymella eutypoides* Chen., n. form; *Neopeckia Carpini* Chen. et Flag n. form.—Fred C. Werkenthin.

1070. CLELAND, J. BURTON, AND EDWIN CHEEL. Australian fungi: notes and descriptions, No. 1. Trans. Roy. Soc. South Australia 42: 88-138. Pl. 9-12. 1918.—This paper is given over entirely to a description of the mushrooms of Australia; 80 species are dealt with in considerable detail, and of these ten are described as new. This paper is accompanied by four colored plates.—J. H. Faull.

1071. COERPER, FLORENCE M. Bacterial blight of soybean. Jour. Agric. Res. 18: 179-193. Pl. A (colored) and 12-18. 1 fig. 1919.—See Bot. Absts. 4, Entry 1268.

1072. CONN, H. J., AND J. W. BRIGHT. Ammonification of manure in soil. New York Agric. Exp. Sta. [Geneva] Tech. Bull. 67. 45 p. 1919.—See Bot. Absts. 3, Entry 850; 4, Entry 1643.

1073. COTTON, A. D. The occurrence of oak mildew on beech in Britain. Trans. British Mycol. Soc. 6: 198-200. 1919.—*Microsphaera Alni*.

1074. COTTON, A. D. Entomogenous fungi new to Britain. Trans. British Mycol. Soc. 6: 200-203. 1919.—Few entomogenous fungi have been recorded for the British Isles and *Empusa aphidis* Hoff., *Empusa Fresenii* Nowakowski, *Empusa sphaerosperma* Fresen., and *Cladosporium aphidis* Thüm are listed here as new.—H. M. Fitzpatrick.

1075. COTTON, A. D., AND E. M. WAKEFIELD. A revision of the British Clavariæ. Trans. British Mycol. Soc. 6: 164-198. 1919.—This paper is not claimed to be a complete monograph of the British species of the genus, but it is felt that though new species may be subsequently added little fundamental alteration will be necessary in the work already covered. The present revision includes 37 species. Two of these are new and four others have been previously described in recent years by Cotton. One species, *Cl. fastigiata*, is reduced to the rank of a variety and given as *Cl. corniculata* var. *pratensis*. Twenty-two names have been excluded from the British list as synonyms or indeterminables. A key is provided for the separation of the species, and macroscopic characters are used where possible, though spore measurements are frequently also stated. The monograph is not illustrated. The authors hope to prepare a monograph of the world's species of the genus at a later date.—H. M. Fitzpatrick.

1076. COULTER, J. M. Rusts of Costa Rica. [Rev. of: ARTHUR, J. C. Uredinales of Costa Rica based on collections by E. W. D. Holway. Mycologia 10: 111-154. 1918.] Bot. Gaz. 67: 184. 1919.—See Bot. Absts. 1, Entry 384.

1077. COULTER, J. M. Hydnumaceae of North Carolina. [Rev. of: COKER, W. C. The Hydnums of North Carolina. Jour. Elisha Mitchell Sci. Soc. 34: 163-197. 29 pl. 1919.] Bot. Gaz. 68: 72. 1919.

1078. COULTER, J. M. Agaricaceae of Michigan. [Rev. of: KAUFFMAN, C. H. The Agaricaceae of Michigan. Mich. Geol. Biol. Surv. Publ. 26 (Biol. Ser. 5). Vol. 1: 924 p. 4 fig. 1918.] Bot. Gaz. 67: 279-280. 1919.—See Bot. Absts. 2, Entry 627.

1079. CROSSLEY, M. L. Gentian violet—its selective bactericidal action. Jour. Amer. Chem. Soc. 41: 2083-2090. 1919.

1080. DEMANGE, V. Notes sur quelques champignons comestibles, vénéneux ou curieux du Tonkin et de l'Annam. [Notes on some edible, poisonous or curious mushrooms of Tonkin and Annam.] Bull. Econ. Indochine 22: 592-609. Fig. 1-16. 1919.—A somewhat popular account of about 50 species observed by the author.—E. D. Merrill.

1081. DE WAAL, J. W. Het aantoonen van bacterium coli in drink water. [Detection of bacterium coli in drinking water.] Pharm. Weekblad 56: 1065-1070. 1919.—A review of the various methods for detecting coli bacilli and a detailed description of the fermentation method by means of Kubel-Tiemann's culture medium.—H. Engelhardt.

1082. DOIDGE, ETHEL M. An interesting group of leaf fungi. South African Jour. Nat. Hist. 1: 164-171. Pl. 7-9. 1919.—A more or less popular account of fungi belonging to the Perisporiaceae and the Microthyriaceae, which occur plentifully in some parts of South Africa. Instructions are given for collecting and preserving these fungi and for making permanent microscopic preparations.—E. M. Doidge.

1083. DUFOUR, L. [Rev. of: ARNAUD. Les Asterinees. (The Asterineae.) Thèse Fac. Sci. Paris 1918.] Rev. Gén. Bot. 31: 414-416. 1919.

1084. DUFRENOY, JEAN. Metaphanic and progressive variation in *Beauveria*: its phyletic significance. Mycologia 11: 276-277. 1919.—Observations on spore formation in *Beauveria globulifera*, an insect inhabiting fungus, show phases varying from a budding process to a complex conidial system. This is believed to be of phylogenetic significance as the various conidial forms "actually link the *Beauveria* both to the lower and to the higher Conidio-sporae."—H. R. Rosen.

1085. DUFRENOY, J. Une Sphériacée parasite des feuilles d'Arbousier. [A parasitic fungus on leaves of *arbutus* belonging to the Sphaeriaceae.] Bull. Trimest. Soc. Mycolog. France 34: 99-100. Fig. 1. 1919.—The author gives a brief description of a parasitic fungus on leaves of *Arbutus Unedo*, which on account of the simple ascospores seems to fall into the genus *Guignardia* and the species *G. Vaccinii*. The text figure illustrates the peritheciium of *Guignardia* sp. n.—Fred C. Werkenthin.

1086. DUMÉE, P. Quelques mots sur le *Nidularia confluens* Fr. [A brief discussion of *Nidularia confluens* Fr.] Bull. Trimest. Soc. Mycolog. France 34: 97-98. 1918.—The author briefly discusses *Nidularia confluens* which was collected in the forest of Sénart in December, 1917.—Fred C. Werkenthin.

1087. DUFFEE, THOMAS. Lichens of the Mt. Monadnock region, N. H.—No. 11. Bryologist 22: 15-16. 1919.—Fifteen species are listed without localities.—Edward B. Chamberlain.

1088. DURRELL, L. W. The imperfect stage of *Leptosphaeria tritici* of wheat. *Science* 50: 252-253. 1919.—In connection with studies of anthracnose of small grains, a species of what seemed to be an *Ascochyta* has frequently been found on dead straw. Recently, while culturing *Leptosphaeria tritici*, the relationship of these two forms has been revealed. The pycnidial fruiting bodies grow side by side with the perithecia of *L. tritici*, on dead wheat straw in the spring. The pycnidia are filled with guttulate spores, usually two-celled, and approximately $12-20 \times 3.4-4 \mu$. Single spore cultures of the ascospores of *L. tritici* obtained by the Hansen method of isolation, produce on potato agar and on sterile straw, pycnidia and pycnospores like those found growing with the perithecia on the wheat plant.—A. H. Chivers.

1089. EDGERTON, C. W. A new *Balansia* on *Cyperus*. *Mycologia* 11: 259-261. Pl. 12. 1919.—The fruiting parts of *Cyperus virens* are found to be displaced by large black sclerotia. Young sclerotia develop hyaline conidia. Perithecia are developed in the outer layer of the mature sclerotium. A technical description of *Balansia cyperi* sp. nov. is presented.—H. R. Rosen. ¶

1090. ELLIOTT, JESSIE S. BAYLISS. On the method of growth of the conidial clusters of *Trichothecium roseum*. *Trans. British Mycol. Soc.* 6: 37-38. Fig. 1-4. 1918.—The conidia are found not to be inserted, as usually figured, at the same level at the tip of the conidiophore. By a peculiar basipetal method of growth long chains or racemes of conidia are formed which are pendant from the apex of the conidiophore. The details of the process are figured.—H. M. Fitzpatrick.

1091. ELLIOTT, JESSIE S. BAYLISS. Some new species of fungi imperfecti. *Trans. British Mycol. Soc.* 6: 56-61. Pl. 1. 1918.—*Aegerita viridis* n. sp. and *Clonostachys dichotoma* n. sp. on rotten wood, and *Dendrodochium album* n. sp. and *Trichocrea oödes* n. sp. on fallen pine cones are described and figured. *Haplographium fusoides* (Preuss) Sacc. and *Sterigmatocystis phaeocephala* Sacc. are recorded for the first time for the British Isles, and are also figured.—H. M. Fitzpatrick.

1092. ERIKSSON, JAKOB. Etudes biologiques et systematiques sur les Gymnosporangium suédois. [Taxonomy of Gymnosporangium in Sweden.] *Compt. Rend. Acad. Sci. Paris* 168: 470-473. 1919.—In Sweden two species of *Gymnosporangium* occur on *Juniperus communis*—*G. clavariaeforme* (Jacq.) DC. and *G. tremelloides* (A.Br.) v. Treb. Of the former three biologically different forms occur in different countries, as follows: 1. f.sp. *Crataegi*, with aecidia, *Rostelia lacerata* (Sow.) Fr., on various species of *Crataegus*, rarely on *Cydonia vulgaris* and *Pyrus malus*, as well as on *Amelanchier canadensis*, *A. erecta* and *A. vulgaris*. 2. f.sp. *Pyrus communis*, with aecidia on *Pyrus malus*, exceptionally on *Crataegus*, *Cydonia vulgaris* and *Amelanchier vulgaris*. 3. f.sp. *Amelanchieris*, with aecidia on various species of *Amelanchier*. Five biologically different forms of *Gymnosporangium tremelloides* occur in different countries, as follows: (1) f.sp. *Aucupariae*, with aecidia, *Rostelia cornuta* (Pers.) Mull., on *Sorbus Aucuparia*, occasionally on *Cydonia vulgaris*, and rarely on *Sorbus Aria* and *Pyrus malus*. (2) f.sp. *Mali*, with aecidium, *Roestelia penicillata* (Mull.) Fr., on *Pyrus malus*, occasionally on *Cydonia vulgaris*, rarely on *Pyrus communis* and *Sorbus Aucuparia*. (3) f.sp. *Amelanchieris*, with aecidium, *Roestelia Amelanchieris* (DC.) Roun., on *Amelanchier vulgaris*. (4) f.sp. *Tormalis*, with aecidium on *Sorbus Tormalis* and *S. latifolia*, and occasionally on *S. Aria*, *S. chamaemespilus* and *S. hybrida*. (5) f.sp. *Ariae*, with aecidium on *Sorbus Aria*, occasionally on *S. Chamaemespilus*. In southern Sweden an aecidial stage on pear was also found, which appeared to belong to *Gymnosporangium clavariae* f.sp. *Pyri-communis*.—F. B. Wann.

1093. ERIKSSON, JAKOB. Zwei russische Gymnosporangieen. [Two Russian Gymnosporangia.] *Ark. Bot.* [Stockholm] 15: 1-23. Pl. 1-3. 1919.—The author describes two species of *Gymnosporangium* obtained from Russian sources and gives the results of numerous cross inoculation experiments on several genera of *Pomeae*. As a result of his studies of the

fungi and his inoculations, he concludes that the two forms belong to the species *Oxycedri* Bres. and *tauricum* n. sp. The article is written in German and is illustrated by photographs of the specimens and by a colored plate showing spore forms and germination as well as spermogonia and Roestelia production on the leaves of species of *Crataegus*, *Mespilus* and *Cydonia*. [See Bot. Absts. 3, Entry 2128.]-W. W. Gilbert.

1094. FAULL, J. H. Pineapple fungus or enfant de pin or wabadou. *Mycologia* 11: 267-272. 1919.—See Bot. Absts. 3, Entry 2802.

1095. FINK, BRUCE. Additions to lichen distribution in North America. *Mycologia* 11: 296-307. 1919.—A list of 212 species of lichens many of them collected by the writer on the islands of Puget Sound. Locality, name of collector and substratum are noted under each species.—H. R. Rosen.

1096. FINK, BRUCE. British lichens. [Rev. of: SMITH, ANNIE LORAIN. A monograph of the British lichens. Vol. 1. 519 p., 71 pl., 11 fig. The British Museum. 1918.] Bot. Gaz. 67: 268. 1919.—The reviewer commends the work very highly, but criticises the author strongly for adhering to the concept of the duality of lichens.—H. C. Cowles

1097. FOEX, ET. L'oidium brun des Euphorbes. [The brown Oidium of Euphorbia.] Bull. Soc. Path. Vég. France 6: 31-34. 1919.—A mildew, *Sphaerotheca euphorbiae* (Cast.) Salm. is reported on *Euphorbia verrucosa* from Switzerland. Its relation to *Sphaerotheca mors-uvae* is discussed and the opinions of various authors cited. The fungus frequently occurs associated with *Uromyces scutellatus* (Schränk) Lév. which causes a hypertrophy of the host.—C. L. Shear.

1098. FOEX, ET. Emission et germination des Ascospores de *Leptosphaeria herpotrichoides*. [The discharge and germination of ascospores of *Leptosphaeria herpotrichoides*.] Bull. Soc. Path. Vég. France 6: 57-61. 1919.—The expulsion of ascospores from perithecia placed in water is described. All the spores in an ascus are discharged en masse and are enveloped in a gelatinous substance which gradually dissolves and the spores separate. In germination of the spores a tube usually appears at the end and soon forms a brown appressorium. Further development of the mycelium is also described.—C. L. Shear.

1099. FOEX, ET. Sur le piétin du blé. [Foot-rot of wheat.] Compt. Rend. Acad. Agric. France 5: 543-548. 1919.—See Bot. Absts. 3, Entry 2644.

1100. FOEX, ET. Note sur le piétin du blé. [Note on the foot disease of wheat.] Bull. Soc. Path. Vég. France 6: 52-54. 1919.—See Bot. Absts. 3, Entry 2645.

1101. GEE, N. G. A beginning of the study of the flora and fauna of Foochow and vicinity. Jour. Roy. Asiatic Soc. North-China Branch 50: 170-184. 1919.—See Bot. Absts. 3, Entry 2460.

1102. GROVE, W. B. Species placed by Saccardo in the genus *Phoma*. Kew Bull. Misc. Inf. [London] 1919: 177-201. *Illust.* 1919.—The author gives a critical account of various species assigned to *Phoma* by Saccardo in volume 3 of the Sylloge. It is a continuation of a previous paper by the same author in Kew Bull. Misc. Inf. 1917. The British Species of *Phomopsis*. Many of the species here considered are based upon specimens received by Berkeley or Cooke from the United States. Transfers of species of *Phoma* are made to *Colletotrichum*, *Cytospora*, *Dendrophoma*, *Diplodia*, *Dothiorella*, *Gloeosporium*, *Phomopsis*, *Pseudodiplodia* and *Rhabdospora*. The following species are described as new:—*Camarosporium wistariae*, *Coniothyrium ephedrinum*, *Laestadia ailantheri*, *Microdiplodia wistariae*, *Phomopsis viridarii* and *Phomopsis viticola ampelopsidis*.—E. M. Wilcox.

1103. GUBA, E. T., AND P. J. ANDERSON. Phyllosticta leaf spot and damping off of snapdragons. *Phytopath.* 9: 315-325. 1919.—See Bot. Absts. 4, Entry 1293.

1104. GUEGAN, MARCEL. Quelques remarques sur deux champignons communs. [Remarks about two common fungi.] Bull. Trimest. Soc. Mycolog. France 34: 110. 1919.—The author says that about 15 years ago *Lepiota procera* was found in great quantities in certain grass lands, while today this *Lepiota* is almost extinct. *Cantharellus cibarius* according to the author is found in great abundance under fir trees, but such specimens are weak, colorless and without taste, while those found in mixed underwood although not found in large bunches are quite vigorous and highly colored.—Fred C. Werkenthin.

1105. GUILLIERMOND, A. *Zygosaccharomyces Nadsonii*; nouvelle espèce de levures à conjugaison hétérogamique. [*Zygosaccharomyces Nadsonii*, a new species of yeast.] Bull. Trimest. Soc. Mycolog. France 34: 111–122. Pl. 4–7, fig. 1. 1919.—The author describes a new species of yeast, *Zygosaccharomyces Nadsonii*, which was isolated from the syrup of bitter oranges. The formation of heterogametes by this species is illustrated by 70 drawings on plate VI.—Fred C. Werkenthin.

1106. HARDER, EDMUND CECIL. Iron-depositing bacteria and their geologic relations. U. S. Geol. Surv. Prof. Paper 113. 89 p., 14 fig., 12 pl. (4to). 1919.—The field work on which these studies are based was done largely with the bog-iron deposits of the Cayuna Range, Minn., as well as with the waters of Wisconsin; the laboratory work largely at the University of Wisconsin. In addition to the higher filamentous, iron-depositing bacteria, the author has studied the iron-precipitating properties of certain almost universally distributed lower bacteria of soil and water, including coccus and bacillus forms. He concludes that there are three principal groups of iron-depositing bacteria: (1) those that precipitate ferric hydroxide from solutions of ferrous bicarbonate, using the carbon dioxide set free and the available energy of the reaction for their life processes; (2) those that do not require ferrous bicarbonate for their vital processes but that cause the deposition of ferric hydroxide when either inorganic or organic iron salts are present; and (3) those that attack iron salts of organic acids, using the organic acid radicle as food and leaving ferric hydroxide, or basic ferric salts that gradually change to ferric hydroxide. [See Bot. Absts. 4, Entry 1210.]—E. W. Olive.

1107. HAVENS, L. C. A biologic classification of hemolytic streptococci. Jour. Infect. Diseases 25: 315–330. 1919.

1108. HENDERSON, WILLIAM F. Some experiments conducted with pure cultures of bread yeast. Trans. Amer. Microsc. Soc. 38: 221–227. Pl. 23–24, 2 tables. 1919.—Pure cultures of yeast were secured by the plate method from "Yeast Foam." Culture experiments showed that plain agar or agar plus a disaccharid served poorly as a culture medium; while agar plus monosaccharids, especially glucose and levulose, encouraged abundant growth. The morphology of the yeast cell was found greatly modified when grown to old cultures on solid media. Much elongation of the cell took place at the margin of the colony due to the exhaustion of food as the yeast progressed radially from the center of the colony. Branching was frequently found among the elongated cells. Yeast grows best under aerobic conditions; but will develop under "limited" anaerobic conditions. A maximum of gas was produced from glucose. Varying amounts were produced from other sugars.—M. Mulvania.

1109. HERRMANN. [Rev. of: MIEHE, H. Die Bakterien und ihre Bedeutung in praktischen Leben. (Bacteria and their meaning in practical life.) 32 fig. Leipzig. 1917.] Forst. Rundschau 20: 12–13. 1919.

1110. HOERNER, G. R. Biologic forms of *Puccinia coronata* on oats. Phytopath. 9: 309–314. Pl. 19–20, 4 fig. 1919.—See Bot. Absts. 4, Entry 1301.

1111. HÖHNEL, FRANZ V. Fragmente zur Mykologie XIX. Mitteilung, Nr. 1001 bis 1030. [Mycological Fragments XIX, 1001–1030.] Sitzungsber. K. Akad. Wiss. Wien (Math.-Nat. Kl.) 126: 283–352. Fig. 1–19. 1917.—*Chaetostroma pedicellatum* Preuss is stated to be identical with *Volutella ciliata* (A. & S.) Fr. f. *minor* D. Sacc., and is made the type species of a

new genus *Peniophorina* which differs from *Peniophora* and *Wiesnerina* in having a shield- or cushion-shaped fruit body. A species of *Claudopus* found to be parasitic on *Tomentella* sp. is named *C. tomentellicola* v. Höhnelt. Its possible identity with *Leptonia parasitica* Quélet and *C. subdepluens* Fitzpatrick is recognized. *Hypholoma lacrymans* Fr. and *Stropharia caput Medusae* Fr. are shown not to be identical as claimed by Ricken. The need of a new separation of the genera of the Hysteriaceae based on the relation of the fruit body to the host tissue is pointed out. To emphasize this point the fruit body in *Hypodermella Laricis* v. Tubeuf is shown to be intraepidermal while that in *Gloniella perexigua* (Speg.) Sacc. is subcuticular. An hitherto undescribed imperfect stage of the latter species is given as *Leptothyria perexigua* v. H. n. sp. The perfect stage of *Leptothyrium Lunariae* Kze. is transferred from *Microthyrium* to *Gloniella* and cited as *Gloniella Lunariae* (Fekl.) v. H. n. comb. The genus *Ascospora* Fries is discarded because the type and other species are more properly placed elsewhere, and *A. microscopica* Niessl is transferred to *Gloniella*, being called *G. microscopica* (Niessl) v. H. The imperfect stage of this species is made the basis of a new genus, *Rhabdothyrella*, of the Leptostromataceae. This genus is closely related to, or perhaps identical with, *Cystothyrium* Speg. *Leptostroma virgultorum* Sacc., having been found closely associated on canes of *Rubus* with *Hypoderma Rubi* (P.), is regarded as its conidial stage. The fungus is transferred to *Hypodermina* v. H., and is called *Hypodermina virgultorum* (Sacc.) v. H. The statement is made that a new separation of the genera of the Hypodermineae and Phacidiaceae based on the relation of the fruit body to the host is necessary. This has already been supplied for the closely related group, the Dothideales. Since the fruit bodies of *Hypoderma scirpinum* DC. are subcuticular this species should be transferred to *Gloniella* Sacc. emend Rehm. A sharp and satisfactory separation could be accomplished by placing in *Hypoderma* the intraepidermal and in *Gloniella* the subcuticular species. When the genus *Entopeltis* v. H. was erected in 1910, doubt was expressed concerning its systematic position. It is now stated to be unquestionably a member of the Hypodermineae. The genus *Vizella* Saccardo is also placed here. In both genera the fruit bodies are subcuticular. *Phacidium Piceae* Fekl., placed by Rehm in *Coccomyces*, is here shown from an examination of the type material to be merely the form of *Lophodermium pinastri* (Schrad.) which occurs on the needles of the silver fir. Rostrup applied the name, *L. abietis* R., to this form stating that it differs in having shorter asci and spores. If this species is accepted the name, *L. Piceae* (Fekl.) v. H., must be used. The genus *Pseudophacidium* was founded by Karsten but was incorrectly characterized. The four species included by Karsten are here shown not to be of the same generic type. The type species *Ps. Ledi* (A. & S.) Karsten is retained in the genus and the generic characterization is emended. *Pseudophacidium degenerans* Karsten and *Ps. Rhododendri* Rehm are made the basis of a new genus, *Myxophacidium*, the first named being cited as the type. Four other species, *Ps. microspermum* (Fekl.) Rehm., *Ps. Rehmi* (Feltgen) v. H., *Ps. Betulae* Rehm, and *Ps. Callunae* Karsten, are made the basis of another new genus, *Myxophacidiella*, the first named species being cited as the type. The second new genus differs from the first in lacking paraphyses and in possessing long-stalked asci. Both genera are placed in the Phacidiaceae. *Pseudophacidium rugosum* (Fries) Rehm is shown to be more properly called *Phacidium rugosum* Fries. *Pseudophacidium atroviolaceum* v. H. is shown to be the same as *Phacidiella discolor* (Mout. et Sacc.) Potebnia, and to fall more properly in the latter genus. The genus *Phacidiella*, placed by Potebnia in the *Pseudophacidiaceae* is found to belong rather to the *Stictidiaceae*, and the generic characterization is emended from this standpoint. The imperfect stage of *Phacidiella discolor* (Mout. et Sacc.) Potebnia, called by Potebnia *Phacidiopycnis Malorum* P., is shown to be the same as *Cytispora Pyri* Fekl., and, since *Phacidiopycnis* Potebnia is known to be the same as *Discula Sacc.*, the binomial *Discula Pyri* (Fekl.) v. H. is given. A comparative study is made of the five species included by Rehm in *Stegia* Fries. Sections show that the position of the fruit bodies in the host is different in the different species. Chiefly on this basis several new genera are erected. *Stegia Lauri* (Cald.) Sacc. is made the type of a new genus, *Stegopeziza*, a member of the *Dermateaceae* in which the ascomata are formed below the epidermis. *Stegia alpina* (Fekl.) Rehm is made the type of a new genus, *Sarcotrochila*, closely related to *Trochila*, and the ascomata are found to be intraepidermal. *Stegia subvelata* Rehm is made

the type of a new genus, *Hysteropezizella*, closely related to *Hysteropeziza* and with it forming a group between the *Pyrenopezizaceae* and the *Mollisiaceae*. Here the ascomata are developed below the epidermis. *Stegia fenestrata* (Roberge) Rehm is made the type of a new genus, *Hysterostegiella*, of the *Hysteropezizaceae*, differing from *Hysteropezizella* in that the ascomata are buried deeply in the host tissue. In *Hysterostegiella* is also included *Stictis valvata* Montagne. Throughout the entire paper frequent expression is given to the conviction that in the *Hypodermineae*, *Euphacideae*, *Pseudophacideae*, *Stictidiaceae*, *Pseudopezizaceae*, *Pyrenopezizaceae* and similar groups the classification will be placed on a sound basis only by giving attention to the position of the ascomata in the host tissue. *Nacria minutula* (Sacc. & Malbr.) Rehm, *N. exigua* Mout. & Sacc., *Trochila Epilobii* Karsten, and *Peziza Tripolii* Berk. & Br. are transferred to the genus *Phacidium*. A detailed discussion of the synonymy of *Podophacidium terrestre* Niessl is given. *Podophacidium* Niessl (syn. *Melachroia* Boudier) is referred to the *Tryblidiaceae*. *Sphaeronema Spinella* Kalchbrenner is transferred to *Cytospora* and discussed as the imperfect stage of *Tympanis saligna* Tode. The genus *Cytospora* is removed from the *Cytosporaceae* since its spores are not allantoid and is placed near *Chondropodiella*. The ascigerous stage of *Gelatinosporium pinastri* (Mougeot) v. H. is found to be a new species of *Scleroderris* and is named *S. pinastri* v. H. *Unguicularia raripila* v. H. n. sp. is described. It was collected on dead stems of *Lavatera thuringiaca* in Austria. From a study of *Habrostictis rubra* Fekl. (syn. *Peziza lasia* B. Br.) the conclusion is reached that the genera *Habrostictis* and *Ocellaria* are closely related. The genus *Cheilodonta* Boudier is retained for *Peziza carpoboloides* Crouan. *Pyrenopeziza Agrostemmatidis* Fekl., regarded by Rehm as a doubtful species of *Niptera* and known hitherto only from the original description, is rediscovered on dead leaves of *Agrostemma Githago* together with the imperfect stage, *Gloeosporium Delastreii* Lacroix, on the stems. Examination of this material shows it to be in reality a species of *Fabraea* and the name *F. Agrostemmatidis* (Fekl.) v. H. is proposed. *Fabraea implexa* Bres. & Carestia on *Lychnis* seems identical. The genus *Diplosporionema* is tentatively advanced for *Gloeosporium Delastreii* Lacroix which is shown not to be a *Gloeosporium*. *Peziza sphaeroides* var. *Lychnidis* Desmaz. is found to be the same as *Pirottaea veneta* Sacc. & Speg. The latter name takes precedence since the name applied by Desmazières is a *nomen nudum*. Examination of the original material of *Asteroma impressum* Fekl. leads to doubt concerning the validity of this species. *Peziza pulveracea* Alb. & Schw. is transferred to *Dasyscypha* and the synonymy is discussed. *Peziza echinophila* Bulliard, variously classified elsewhere, is here transferred to *Rutstroemia*. *Lachnea (Cheilymenia) furcifera* v. H. n. sp. is described. The validity of *Aposphaeriopsis fusco-atra* Diedicke is questioned, and its identity with certain other described species is suggested. *Nitschkea Flageoletiana* Sacc. is shown to be the same as *Microthyrium epimyces* Sacc., its identity with *Dothidea episphaeria* Peck is suspected, and its removal to the genus *Loranthomyces* v. H. is recommended. *Melanospora similis* v. H. n. sp. is described from branches of *Cornus sanguinea*. It resembles greatly *M. theleboides* (Fekl.) Wint. A short discussion is given of *Amphisphaeria sapinea* Karsten (syn. *A. dolioioides* Rehm). *Sphaeria mutabilis* Pers. is transferred to *Enchosphaeria* and is described in detail under the name *E. mutabilis* (Pers.) v. H. The genus and species *Trichocollonema Acrotheca* v. H. previously described are here shown to be invalid and are withdrawn. The species described is probably *Zignoëlla macrospora* Sacc. *Aposphaeriella gregaria* Diedicke is shown to be the imperfect stage of *Zignoëlla (Zignoëna) pygmaea* (Karst.) Sacc. The ascigerous stage of *Pestalozzia truncata* Léveillé is probably *Ceratostoma Vitis* Fuckel. This conclusion and other similar ones recorded here are based on the examination of material, not on the results of cultures. Appended to the paper is a complete alphabetical list of all the fungi mentioned.—H. M. Fitzpatrick.

1112. HÖHNEL, FRANZ V. Fragmente zur Mykologie XX. Mitteilung. Nr. 1031 bis 1057 [Mycological Fragments XX. 1031–1057] Sitzungsber. K. Akad. Wiss. Wien (Math.-Nat. Kl.) 126: 353–399. Fig. 1. 1917.—A new genus, *Discosphaerina* v. H., regarded as closely related to *Guignardia*, is founded on a hitherto undescribed species occurring on the leaves of *Solidago virgaurea*. The species, *D. discophora* v. H., differs from species of *Guignardia* in lacking a definite ostiolum, and in the peculiar structure of the perithecial wall. *Mycosphaerella tar-*

diva Sydow, originally described from immature specimens, is here redescribed in detail from a recent collection of well developed material. *Sphaeria tosta* Berk. & Br., *Sphaerella Fuckelii* Pass., and *Sphaeria tritorulosa* Plowr. are found to be identical, and are discussed under the name *Didymella tosta* (Berk. & Br.) Sacc. *Gnomonia riparia* Niessl is believed to be also this species. *Didymella drymeia* v. H. is described as new from *Carex drymeia*, and the pycnidial stage, *Phyllosticta drymeia* v. H., is referred to the Sclerophomeae. *Massariopsis macrosporella* v. H. on dead twigs of *Acer campestre* is described as new. A new genus, *Cryptophaeella* v. H., is founded on *Coniothyrium Heteropatellae* v. H. This genus is referred to the Sclerophomeae and is characterized by the absence of definite conidiophores and by the parasitic habit. The pycnidia occur inside the perithecia, apothecia, and pycnidia of other fungi. *Diplodiella Angelicae* Diedicke is shown to have been founded on immature perithecia of *Leptosphaeria Dolium* (P.) parasitized by *Didymosphaeria conoidea* Niessl and the species is discarded. The original description of *Metasphaeria Lonicerae* Fautrey having been prepared from poorly developed material, the species is here redescribed from a recent collection of mature material. *Byssothecium circinnans* Fuckel is regarded as the ascigerous stage of *Phoma roseola* Desm. and the synonymy of the species is discussed. *Leptosphaeria Calami* Karsten, *L. Acori* K., *L. acorella* Cooke, and *L. densa* Bres. are shown to be identical, and the binominal *L. Calami* Karsten being the oldest is retained for the species. *Leptosphaeria juncina* (Auersw.) and *L. juncicola* Rehm. are regarded as closely related to *L. Calami* K. and the three species are, according to Von Höhnelt, probably in reality more properly referred to the genus *Scleropleella* v. H. of the Pseudosphaeriaceae. *Asterosporium Hoffmanni* Kunze is shown to be the conidial condition of *Massaria macrospora* (Desm.) Sacc. and the new genus, *Asteromassaria*, is based on the species. *Sphaeria hirta* Fries is transferred to the genus *Karstenula*, and is discussed as *K. hirta* (Fr.) v. H. The conidial stages of this and a related species, *K. rhodostoma* (A. & S.) Speg., are discussed and the synonymy given. A new genus, *Plagiostromella* v. H., is founded on *Pl. pleurostoma* v. H. on *Sapidus* sp. in Japan. A detailed description of the species is given accompanied by text figures. The genus is of doubtful position. The fruitbody is pluri-locular, has a definite ostium, and bears its asci laterally. The species resembles a *Phyllachora* superficially but seems to be nearer the Sphaeriaceae or the Clypeosphaeriaceae. It is suggested that the genus be made the basis of a new family, the *Plagiostromellaceae* v. H. *Sphaeria Scrophulariae* Desm., given by Saccardo as a species of *Leptosphaeria*, is here transferred to *Pleospora* and is called *Pl. Scrophulariae* (Desm.) v. H. *Cucurbitaria Hendersoniae* Fuckel incorrectly placed by Saccardo in *Melanomma* is here transferred to *Gibberidea* as *G. Hendersoniae* (Fckl.) v. H. *Cucurbitaria protracta* Fuckel and *C. acerina* Fuckel are shown to be identical and the first name is retained. The synonymy of the conidial stage is discussed. *Othiella Aesculi* v. H. is described as new and the conidial stage is described under the name *Pyrenochaeta Aesculi* v. H. The fungus is, however, stated to be possibly merely an immature *Cucurbitaria*. *Nitschkia Otth.* 1869 is shown to equal *Winterella* Berl. 1894 and *Winterina* Sacc. 1899. A new genus *Apioportha* v. H. is founded on *Diatrype anomala* Pk., the species being cited as *Ap. anomala* (Pk.) v. H. The genus is closely related to *Diaportha* but differs in having a *Diatrype*-like stroma sunken in the bark, with parallel perithecial necks, and with the cells of the spore unequal. *Sphaeria virgultorum* Fr. is regarded as another species of *Apioportha* and is cited as *Ap. virgultorum* (Fr.) v. H. *Melanconis tiliacea* Ellis is transferred to the genus *Diaportha*. *Calospora occulta* Fuckel is transferred to *Diaportha* and cited as *D. abnormis* v. H., the name *D. occulta* being preoccupied by *D. occulta* (Fuckel) N. *Valsa sorbicola* Nitschke is shown to be a *Diaportha*, and a detailed discussion of the various species of *Diaportha* which occur in Central Europe on *Prunus*, *Sorbus*, *Pirus* and related genera is given. *Diaportha dolosa* Sacc., *D. personata* (C. & E.), *D. oncostoma* (Duby) Fuckel, and *D. fasciculata* Nitschke, all of which occur on *Robinia pseudoacacia*, are shown to be one species and the name *D. oncostoma* (Duby) Fuckel is retained for it. Moreover the pycnidial fungi, *Phomopsis oncostoma* (Thüm) v. H. and *P. pseudoacaciae* (Sacc.) v. H. are shown to be the same species, the former name being retained. *Diaportha leiphaemia* (Fr.) and *D. dryophila* Niessl are shown to be identical. *Sphaeria apiculata* Wallroth, described by Fuckel, is shown to be a *Gnomonia* and is cited as *G. apiculata* (Wallroth-Fuckel) Winter. *Diaportha Spina*

Fuckel is the same fungus. Appended to the paper is a complete alphabetical list of all the fungi mentioned.—H. M. Fitzpatrick.

1113. HOLDEN, M. S. A scheme suggested for the investigation of marine bacteria. Jour. Marine Biol. Assoc. United Kingdom 12: 136-140. 1919.—Briefly suggests methods for studying marine bacteria in cultures of blood-glucose-agar, trypsin-agar, trypsin-broth, and on slides prepared therefrom, using silver nitrate, etc. as staining agents.—G. J. Peirce.

1114. JAHN, E. Myxomycetenstudien. [Myxomycete studies.] Ber. Deutsch. Bot. Ges. 36: 660-669. 1918.—The paper contains notes on the occurrence and morphological features of the following rare forms: *Ceratiomyxa caesia* sp. n., *Badhamia versicolor* Lister, *Badhamia decipiens* Berkeley, *Badhamia ovispora* Raciborski, *Physarum stramineipes* Lister, *Physarum sulfureum* Alb. and Schw., *Didymium tubulatum* sp. n., *Didymium Trochus* Lister, *Leptoderma iridescent* G. Lister, *Licea singularis* sp. n., *Liceopsis lobata* Torrend, *Hemitrichia Karstenii* Lister, *Perichaena pedata* Lister?—Ernst Artschwager.

1115. KAUFFMAN, C. H. The Agaricaceae of Michigan. Michigan Geol. Biol. Survey Publ. 26 (Biol. Ser. 5): Vol. 2, 10 p. Pl. 1-172. 1918.—Excellent heliotype plates from photographs by the author.—See Bot. Absts. 2, Entry 627.—E. A. Bessey.

1116. KING, A. M. Notes on the genus *Balansia*. South African Jour. Sci. 15: 670-673. Pl. 25, fig. 1-4. 1919.—A disease of the grass *Cynodon dactylon* is common near Pretoria. The affected plants are pale yellowish green and produce abnormal, long, erect shoots with short internodes and poorly developed leaves. The sclerotia of the causal fungus develop in the axils of the leaves, the asci and spores developing in December; the fungus belongs to the genus *Balansia* and is probably an undescribed species.—E. M. Doidge.

1117. KLEBAHN, H. Aus der Biologie der Ascomyceten. (The biology of the Ascomycetes.) Ber. Deutsch. Bot. Ges. 36: 47-62. Fig. 1-7. 1919.—The paper contains a general discussion of biological factors of various ascomycetes: ejection of ascospores, types of beaks of perithecia, relationship between the various conidial and ascogenous stages of forms such as *Gnomonia*, *Gloeosporium*, *Mycosphaerella*; parasitism; biological species among saprophytes and parasites. The author suggests that in the case of the form-genus *Entomospodium* the ascogenous stage should fall into a new genus "*Entomopeziza*" because of its peculiar conidia. The various conidial forms developed during the winter and known as *Fusicoccum* and *Sporonema* may be considered as adaptations to the host and climatic conditions only. Biological forms are developed by *Pseudopeziza ribis*, but in this case the forms are also distinguished by slight morphological differences. It is suggested that biological forms may also be developed among saprophytes. *Mycosphaerella punctiformis*, growing on *Tilia*, *Quercus* and *Corylus* show slight differences in pure culture; it is conceivable that the fungus may show preference to a certain substratum and, for example, may grow better on oak leaves than on the leaves of the linden.—Ernst Artschwager.

1118. KONRAD, P. Notes et observations concernant le *Tricholoma tigrinum* Sch. = *T. pardinum* Q. [Remarks on *Tricholoma tigrinum* Sch. = *T. pardinum* Q.] Bull. Trimest. Soc. Mycolog. France 35: 143-146. Pl. 7. 1919.—In the discussion of *Tricholoma tigrinum* the author gives a detailed description of the fungus, its geographical distribution, and furthermore states that the fungus is oftentimes confused with several species of the group *Tricholoma terreum*: which are edible; while *Tricholoma tigrinum* is poisonous.—Fred C. Werkenthin.

1119. LAKON. [Rev. of: LÜDI, WERNER. *Puccinia petasiti-pulchellae* nov. spec. Centralbl. Bakt. II Abt. 48: 76-88. 2 fig. 1917.] Zeitschr. Pflanzenkrankh. 29: 63. 1919.—Haploid phase on *Petasites niveus*, *P. albus*, and *P. hybridus* (pycnia and aecia). Diploid phase on *Festuca pulchella* (uredo). *Poa alpina* and *P. nemoralis* are also hosts. *Puccinia petasiti-pulchellae* is biologically not identical with *P. poarum*. The aecia of *P. poarum* do not affect *Festuca pulchella*. Detailed description and Latin diagnosis.—H. T. Güssow.

1120. LEVINE, MICHAEL. Life history and sexuality of Basidiomycetes. [Rev. of: BENS AUDE, MATHILDE. Recherches sur le cycle évolutif et la sexualité chez les Basidiomycètes. 156 p., 13 pl., 30 fig. Nemours, 1918. (See also Bot. Absts. 3, Entry 347.)] Bot. Gaz. 68: 67-68. 1919.

1121. LEVINE, MICHAEL. Sexuality in the Basidiomycetes. [Rev. of: BENS AUDE, MATHILDE. Recherches sur le cycle évolutif et la sexualité chez les Basidiomycètes. 156 p., 13 pl., 30 fig. Nemours, 1918.] Mycologia 11: 280-283. 1919.—Miss BENS AUDE's claim that fusion takes place between two cells coming from two different mycelia as a result of which secondary mycelium is produced, consisting of binucleate cells with clamp connections and which is capable of producing the fruiting body, does not seem to the reviewer to have been fully substantiated. "Her figures are undoubtedly faithful representations of her preparations, but her interpretations are not adequately supported."—H. R. Rosen.

1122. LISTER, GULIELMA. Mycetozoa seen during the visit of the British Mycological Society to Shrewsbury, September 24th to 29th, 1917. Trans. British Mycol. Soc. 6: 15-17. 1918.—A list of species with critical notes in some cases.—H. M. Fitzpatrick.

1123. LISTER, GULIELMA. Mycetozoa found during the Selby foray. Trans. British Mycol. Soc. 6: 88-91. 1918.—A total of fifty-two species is given. Critical notes call attention to the more unusual and interesting collections.—H. M. Fitzpatrick.

1124. MAIRE, RENE. Remarques sur la variation d'une Agaricacée sous l'influence du milieu. [Remarks on the variation of an Agaricus due to the influence of its substratum.] Bull. Trimest. Soc. Mycolog. France 35: 147-149. 1 fig. 1919.—The author mentions the collection of *Rhodopaxillus nudus*, which was found growing in the midst of some *Agaricus campestris* in a substratum quite different from the ones on which we expect to find it. The change in substratum had caused various changes in the structure of this mushroom.—Fred C. Werkenthin.

1125. MATOUSCHEK. [Rev. of: MAJOR, EUG. Mèlanges mycologiques. Vermischtes über Pilze. (Miscellaneous mycological notes.) Bull. Soc. Neuchâteloise Sci. Nat. 41: 40-43. 1913-16. Neuchâtel. 1917.] Zeitschr. Pflanzenkrankh. 29: 61. 1919.—New fungi:—*Uromyces caricis* Raff. sianae on *Carex Raflesiana*. var. *continua* Keck., and *Uredo digitariae ciliaris* on *Digitaria ciliaris* Pers.; both on material from the Philippines. [See next following Entry, 1126.]—H. T. Güssow.

1126. MATOUSCHEK. [Rev. of: MAJOR, EUG. Notes mycologiques. Bemerkungen über Pilze. (Mycological notes.) Bull. Soc. Neuchâteloise Sci. Nat. 31: 17-31. 1913-16. Neuchâtel. 1917.] Zeitschr. Pflanzenkrankh. 29: 60. 1919.—New for region, *Phytophthora erythroseptica* Pethybr. on potatoes. [See next preceding Entry, 1125.]—H. T. Güssow.

1127. MCCALLUM, A. W. The occurrence of *Bulgaria platydiscus* in Canada. Mycologia 11: 293-295. Pl. 14. 1919.—The peculiar apothecia of *Bulgaria platydiscus* Casp., (*Sarcosoma globosum* var. *platydiscus* Casp.), are described. In attempting to germinate the ascospores it was found that the percentage of germination was very much higher on Czapek's agar than on potato agar and suggests the use of the former medium for spore germination in other related fungi.—H. R. Rosen.

1128. MCKINNEY, H. H. Nomenclature of the potato scab organism. Phytopath. 9: 327-329. 1919. The writer studied three strains of potato scab organisms all pathogenic upon potato and all of which produced characteristic pigmentation on gelatin and agar media. These differed slightly in virulence and pigment formation but were considered identical with the scab fungus described by Drechsler and therefore to be given the binomial *Actinomyces scabies* (Thax.) Güssow and classed among the Hyphomycetes in the family Mucedinaceae.—Maude Miller.

1129. MELLO, F. DE, AND J. F. ST. ANTONIO FERNANDES. Révision des champignons appartenant au genre *Nocardia*. [Revision of the fungi belonging in the genus *Nocardia*.] Mem. Asiatic Soc. Bengal 7: 103-138. 1919.—This paper includes a synopsis of about 90 species, a few of which are described as new, the occurrence of each species in nature, synonyms, and a resume of the biological and cultural characters of each.—*E. D. Merrill*.

1130. MOREAU, F. M., AND MME. MOREAU. Recherches sur les lichens de la famille Peltigeracées. [Researches on the lichens of the family Peltigeraceae.] Ann. Sci. Nat. Bot., X. 1: 29-32. 1919.—Authors propose to publish on (1) the fungi that enter into the formation of the lichens; (2) the algal symbionts; (3) a study of the complex resulting from their association. [Only the introduction printed in this number.]-*J. P. Kelly*.

1131. MOREAU, FERNAND. Notions de technique microscopique.—Application à l'étude des champignons. [Rudiments of microscopical technique. Its application to the study of fungi.] Bull. Trimest. Soc. Mycolog. France 34: 137-191. Fig. 1-35. 1919.—Chapter I gives detailed descriptions of how to use the microscope. Chapter II takes up methods of microscopical study of fungi. Chapter III gives methods for the study of nuclei of fungi. The last chapter takes up the microscopical technic for the study of the protoplasm of fungi.—*Fred C. Werkenthin*.

1132. MURRILL, W. A. Dr. William Gilson Farlow. Mycologia 11: 318. 1919.

1133. MURRILL, W. A. Collecting fungi in Virginia. Mycologia 11: 277-279. 1919.—Notes on various woody and fleshy fungi observed during July are presented. Mention is made of a leaf-spot of *Acer negundo* and *A. platanoides*, and a blackening and decay of fruit of *Juglans regia*. [See Bot. Absts. 3, Entry 2709.]-*H. R. Rosen*.

1134. MURRILL, W. A. Illustrations of fungi XXXI. Mycologia 11: 289-292. Pl. 13 (colored). 1919.—Technical descriptions, critical notes and colored illustrations of *Cortinarius alboviolaceus* (Pers.) Fries, *Pholiota squarrosoides* Peck and *Melanoleuca Russula* (Scop.) Murrill, (*Tricholoma Russula* Gill.), are presented.—*H. R. Rosen*.

1135. MURRILL, W. A. Some described species of *Poria*. Mycologia 11: 231-244. 1919.—Thirty-five white and bright-colored North American species of *Poria* are presented together with synonyms, original descriptions, distributions and critical notes. The following new names or new combinations are proposed, *Poria humilis* nom. nov., *P. elachista* (Berk.) comb. nov. and *P. subsulphurea* (Ellis & Ev.) comb. nov.—*H. R. Rosen*.

1136. MURRILL, W. A. A polypore parasitic on twigs of *Asimina*. Mycologia 11: 319. 1919.—*Inonotus amplexans* is now known to be parasitic on twigs of three species of *Asimina*: *A. parviflora*, *A. pygmaea*, and *A. angustifolia*.—*H. R. Rosen*.

1137. MURRILL, W. A. An orange-colored puffball. Mycologia 11: 319-320. 1919.—The rare *Calvatia* (*Lycoperon*) *rubroflava* was collected in a dahlia bed of the New York Botanical Garden. Cragin's description of this species is copied and the fact noted that the New York plant is larger than those described by Cragin, measuring 3½ inches broad and nearly 3 inches high.—*H. R. Rosen*.

1138. MURRILL, W. A. Boleti from Connecticut. Mycologia 11: 321-322. 1919.—A number of boleti collected by H. L. WELLS are listed and his description of *Boletus Gertrudiae* Peck presented.—*H. R. Rosen*.

1139. NORTHROP, J. H., L. H. ASHE, AND J. K. SENIOR. Biochemistry of *Bacillus aceto-ethylicum* [sp. nov.] with reference to the formation of acetone. Jour. Biol. Chem. 39: 1-21. 1919.—See Bot. Absts. 3, Entry 2890.

1140. OVERHOLTS, L. O. Some Colorado fungi. *Mycologia* 11:245-258. 1919.—The author lists 11 species of Ascomycetes of three different orders and 141 species of Basidiomycetes, most of which are fleshy or woody forms.—*H. R. Rosen.*

1141. PATOUILARD, N. Sur deux formes conidiennes de *Porohydnes*. [Two types of conidia of *Polyporus* and *Hydnum*.] *Bull. Trimest. Soc. Mycol. France* 34: 198-201. *Fig. 1-2*. 1919.—The author describes the formation of conidia on *Ptychogaster nodulosus* and *Echinodia Theobromae*.—*Fred C. Werkenthin.*

1142. PAUL, DAVID. Presidential address. On the earlier study of fungi in Britain. *Trans. British Mycol. Soc.* 6: 91-103. 1918.—This is a detailed discussion of the rise of mycology in Great Britain from the earliest times down to the day of Berkeley. The first notice of fungi in the English language is regarded as that published in 1516 in the *Greates Herball*. No attempt is made to follow the advance in the study of mycology outside of the British Isles, but the influence of Fries is mentioned. All of the earlier workers are discussed in chronological order, and the various steps in the evolution of the subject are clearly shown.—*H. M. Fitzpatrick.*

1143. PAVARINO, G. L. Alcune malattie delle orchidee causate da bacteri. [Some bacterial diseases of orchids.] *Atti Ist. Bot. Univ. Pavia* 2, 15: 81-88. *Pl. 13*. 1918.—See *Bot. Absts.* 3, Entry 2724.

1144. PAVARINO, G. L., AND M. TURCONI. Sull'avvizzimento delle piante di *Capsicum annuum* L. [A wilt of *Capsicum annuum*.] *Atti Ist. Bot. Univ. Pavia* 2, 15: 207-211. 1918.—See *Bot. Absts.* 3, Entry 2723.

1145. PEARSON, A. A. On two-spored basidia and other matters. *Trans. British Mycol. Soc.* 6: 39-46. 1918.—The tendency of students of the fleshy basidiomycetes to ignore microscopic characters is pointed out and deplored. The occurrence of bi-spored species is especially emphasized. Also the importance of studying the cystidia, and of making careful drawings of these and the spores is discussed. A brief review of the literature is given from this standpoint.—*H. M. Fitzpatrick.*

1146. PEARSON, A. A. A new *Mycena*. *Trans. British Mycol. Soc.* 6: 135-136. 1919.—*M. epipterygioides* n. sp. regarded as related to *M. epipterygia* (Scop.) Fr. but provided with peculiar finely ciliated brush-like cystidia and with a greenish yellow pileus.—*H. M. Fitzpatrick.*

1147. PELÉ. Note sur *Aleuria Ricciae* Crouan = *Lachnea Ricciae* Gillet. [Remarks on *Aleuria Ricciae* Crouan = *Lachnea Ricciae* Gillet.] *Bull. Trimest. Soc. Mycol. France* 35: 150, 151. 1919.—The author mentions the collection of *Aleuria Ricciae* on *Riccia glauca* in 1918, a fungus, which was omitted in the classification of European Discomycetes by Boudier. The author lists the description of this fungus by Crouan and adds to this his personal observations.—*Fred C. Werkenthin.*

1148. PETCH, T. Mocharas and the genus *Haematomyces*. *Ann. Botany* 33: 405-419. 2 *fig.* 1919.—*Haematomyces spadiceus* was described by BERKELEY AND BROOME, in 1873, as a new genus of fungi from Ceylon. The author finds that this is not a fungus at all but a gum-like exudation, called Mocharas in Ceylon, from wounded or, more commonly, felled *Bombax malabaricum*. The old genus thus falls, but the author prefers to retain *Haematomyces* emended, for species subsequently described by Peck and others. According to his new conception of the genus, it should be placed in the Helvellaceae, and not in the Bulgarieae. A new species, *H. carneus*, is described.—*E. W. Olive.*

1149. PETCH, T. Revisions of Ceylon fungi, Part VI. *Ann. Roy. Bot. Gard. Peradeniya* 7: 1-44. 1919.—A continuation of the series previously published in the same periodical,

being critical notes on, reductions of, and redescrptions of Ceylon fungi, numbers 215 to 272, originally described by Berkeley and Broome from the Ceylon collections made by Thwaites.—*E. D. Merrill.*

1150. PETCH, T. *Gasteromycetae zeylanicae*. Ann. Roy. Bot. Gard. Peradeniya 7: 57-78. 1919.—A list of the Ceylon *Gasteromycetes* in which the following new combinations or new species occur: *Jansia proxima* (B. & Br.) Petch, *Nidularia reticulata* n. sp., *Mitremyces insignis* (Berk.) Petch, *M. Berkeleyi* (Mass.) Petch, *Lanopila bicolor* (Lév.) Petch, *Calvatia Gardneri* (Berk.) Petch, *Bovistella conspurcata* (B. & Br.) Petch, *Scleroderma endoxanthum* n. sp. *S. pseudotipitatum* n. sp., and *Lycogalopsis zeylanica* n. sp. *Pharus* is described as a new genus, its type being *P. Gardneri* Petch, based on *Lysurus Gardneri* Berk.; this name is invalidated by *Pharus* P. Br., a valid genus of the *Gramineae*.—*E. D. Merrill.*

1151. PETCH, T. Further notes on *Colus Gardneri* (Berk.) Fischer. Trans. British Mycol. Soc. 6: 121-132. Pl. 5. 1919.—A detailed account of the controversy which has resulted from the study of this species by FISCHER, LLOYD AND OTHERS. The characters of the genera *Colus*, *Lysurus*, *Anthurus*, etc. are discussed in this connection. Fresh material of *Colus Gardneri* collected in Ceylon is compared with material of *Lysurus australiensis* received in formalin from Australia, and the essential points of difference are enumerated. Finally a new genus, *Pharus*, is based on the species from Ceylon. In this genus the arms of the receptaculum are described as being normally united at the apex, and the glebiferous layer, borne solely on the arms, consists of numerous plicate processes and plates standing perpendicular to the arm and presenting a granular outer surface. The Australian species is retained in *Lysurus*. The two forms are figured.—*H. M. Fitzpatrick.*

1152. PETHYBRIDGE, G. H. Notes on some saprophytic species of fungi, associated with diseased potato plants and tubers. Trans. British Mycol. Soc. 6: 104-120. Pl. 3, 4. 1919.—A species of *Nectria*, found in close association with *Verticillium cinnabarinum* Reinke and Berth., is shown by pure cultures to be the perfect stage of this species, and is described as *Nectria inventa* n. sp. Hallier attributed the disease of potatoes known as "Curl" to the presence of a fungus which he named *Rhizoctonia tabifica* n. sp. He placed the fungus in *Rhizoctonia* because he found in connection with it black, pseudo-parenchymatous bodies which he regarded as sclerotia. These bodies are here shown to be the fruit bodies of a species of *Colletotrichum* and a new species, *C. tabificum* (Hallier pro parte) Pethybridge is described from them. Although it is recognized that the species may be identical with *C. solanicolum* O'Gara, certain differences are pointed out, especially the development by *C. tabificum* of an amethystine fluorescence in the culture medium. Taubenhaus has described a new species of *Colletotrichum* which he regards as identical with *C. solanicolum* and applies to it the name *C. atramentarium* since he regards it as identical with *Phellomyces sclerotiphorus* Frank and this in turn to *Vermicularia atramentaria* B. & Br. Pethybridge here points out the fact that *Spondylocladium atrovirens* Harz, the fructifying stage of *P. sclerotiphorus* Frank, as it occurs in Europe cannot be regarded as a species of *Colletotrichum*. The possibility of the identity of *C. tabificum* and *C. varians* Ducomet is also mentioned. A study of *Hypomyces Solani* Reinke and Berth. in pure culture shows that it produces conidia and chlamydospores resembling in some respects those produced by species of *Fusarium*. There are, however, pronounced differences between typical species of *Fusarium* and the conidial stage of this *Hypomyces*, and it is concluded that *H. Solani* is not the perithecial stage of *Fusarium Solani* or of any other species of *Fusarium*. It is shown, moreover, that *H. Solani* is not parasitic on the potato. Two new species of *Verticillium* isolated from the surface of potato tubers are described and compared with *V. albo-atrum* R. & B. Both were studied in pure culture derived from single conidia and inoculations on the potato were in all cases unsuccessful. The names applied are *V. nubilum* n. sp., and *V. nigrescens* n. sp. *Langloisula macrospora* A. L. Smith was isolated from potato leaves and tubers. Reasons are given for the belief that it is identical with *Monopodium Delacroix* and with *Acromoniella atra* Corda. All of the fungi discussed are figured.—*H. M. Fitzpatrick.*

1153. PUTTERILL, VICTOR ARMSBY. Notes on the morphology and life history of *Uromyces Aloes* Cke. South African Jour. Sci. 15: 656-662. Pl. 22-23, fig. 1-6. 1919.—This is a brief account of the common rust attacking various species of *Aloe* in South Africa. A study was made of the cytological development of the teleutospore, which is similar to that of other *Uredineae*. The occurrence of spermatogonia is noted for the first time; the nuclei of the spermatia occupy about one third of the diameter of the spore. The teleutospores germinate readily, but under no circumstances were sporidia obtained. The mode of entrance of the fungus into the host was not ascertained. From the characters of the basidium of spores from various species of *Aloe*, it would seem that biological, if not true morphological varieties of this fungus exist; this may account in part, for the comparative immunity of some species of *Aloe* growing in close proximity to badly diseased plants of other species.—E. M. Doidge.

1154. RANOÉVITCH, N. Sur une nouvelle espèce de Rouille, *Puccinia Corteyi* Ran. [A new species of rust, *Puccinia Corteyi* Ran.] Bull. Trimest. Soc. Mycol. France 35: 140-141. 1 fig. 1919.—The author reports the collection of a rust on *Heracleum minimum*, a new species and names it *Puccinia Corteyi* after Cortey who collected the specimens in 1917.—Fred C. Werkenthin.

1155. RAUNKIAER, C. En ny *Tulasnella*-Art samt bemaerkninger om *Tulasnella*'s systematiske Stilling. [A new species of *Tulasnella* with remarks on the systematic position of the genus *Tulasnella*.] Bot. Tidskr. 36: 204-209. Fig. 1. 1918.—A description is given of *Tulasnella helicospora* n. sp. which forms a rather insignificant gray colored coating on moist damp leaves, but later becomes more significant. A critical discussion is presented upon the position of the genus *Tulasnella*.—A. L. Bakke.

1156. REA, CARLETON. The Shrewsbury Foray, 24th-29th September, 1917, and a complete list of the fungi gathered during the foray. Trans. British Mycol. Soc. 6: 1-14. 1918.—A discussion of the important events associated with the foray includes the mention of interesting species collected.—H. M. Fitzpatrick.

1157. REA, CARLETON. New or rare British fungi. Trans. British Mycol. Soc. 6: 61-64. Pl. 2. 1918.—*Lepiota fulvella* n. sp., *L. rosea* n. sp., and *Clavaria cinerea* (Bull.) Fr. var. *gracilis* n. var. are described and figured in colors. Notes are given on *Boletus lacteus* Lévy., *Clavaria rugosa* (Bull.) Fr. var. *fuliginea* Fr., *C. chionea* (Pers.) Quél., *Geaster triplex* Jungh., *Cyathipodia villosa* (Hedw.) Boud., *Humaria tetraspora* [Fekl.] Boud., *Dermatea umbrina* Cke. & Massee, and *Antromyces copridis* Fresen.—H. M. Fitzpatrick.

1158. SCALIA, G. Sull' *Ascochyta pisi* Lib. [On *Ascochyta pisi* Lib.] Staz. Sper. Agric. Ital. 51: 228-242. Pl. 3, fig. 1-3. 1918.—From the study of abundant material of *Ascochyta pisi* on beans and peas, examination of exsiccated specimens, and comparison of the diagnoses of several *Ascochyta* species on *Phaseolus* and *Vicia* (*A. fabae* Speg., *A. boltshauseri* Sacc., *A. viciae* Lib., *A. viciicola* Sacc., *A. viciae-pisiformis* Bubak, and *A. viciae-lathyroides* Syd.), the author concludes that the species last named may be regarded as mere forms or varieties of *Ascochyta pisi*. Since the morphological characters are extremely variable, the dimensions of the pycnidia differing in specimens collected from the same plant, and the form and dimensions of spores varying in a single pycnidium, separation into distinct species on the basis of these characters is not justifiable.—E. K. Cash.

1159. SCHOENERS, T. H. C. De tomatenkanker, een voor Nederland ernstige tomatenziekte. [Tomato canker: a serious disease in Holland.] Tijdschr. Plantenz. 25: 174-192. Pl. 3-5. 1919.—See Bot. Absts. 3, Entry 2754.

1160. SMITH, ANNIE LORRAIN. Presidential address. The relation of fungi to other organisms. Trans. British Mycol. Soc. 6: 17-31. 1918.—A brief discussion of some of the well known phenomena of parasitism and symbiosis, with emphasis on the conditions in the lichens. A bibliography of 31 references is given.—H. M. Fitzpatrick.

1161. SMITH, ANNIE LORRAIN. Lichenology, a new departure. Trans. British Mycol. Soc. 6: 32. 1918.—A brief mention of the importance of the inclusion of this subject in the field of mycology in Great Britain.—*H. M. Fitzpatrick.*

1162. SMITH, ANNIE LORRAIN. Hyphomycetes and the rotting of timber. Trans. British Mycol. Soc. 6: 54-55. 1918.—*Torula abbreviata* Corda, *Haplographium finitimum* Sacc., and *Verticillium tenuissimum* Corda were found in rotting structural timbers.—*H. M. Fitzpatrick.*

1163. SMITH, ANNIE LORRAIN. Worthington G. Smith as mycologist. Trans. British Mycol. Soc. 6: 65-67. 1918.

1164. SMITH, ANNIE LORRAIN. New or rare microfungi. Trans. British Mycol. Soc. 6: 149-157. 1919.—The genus *Boydia*, evidently a member of the *Mycosphaerellaceae*, is based on a new species, *B. remuliformis*, found on decaying stems of *Ilex angustifolia*. The spores are peculiar in being constricted at the middle and in having both ends clavate. They are elongated, one-septate, curved, and hyaline. The asci are 8-spored and aparaphysate. The following new species are described: *Melogramma elongatum*, A. L. S. on decaying wood, *Sphaerulina Alni* A.L.S. on bark of *Alnus*, *Phyllosticta Hydrocotyles* A.L.S. on leaves of *H. vulgaris*, *Leptothyrium Fragariae* A.L.S. on leaves of *Fragaria vesca*, and *Coremium Swantonii* A.L.S. on *Vespa sylvestris*, a wasp. About 40 additional fungi, unusual in the British Isles, are listed with critical notes. These forms are chiefly pyrenomycetes and fungi imperfecti.—*H. M. Fitzpatrick.*

1165. SMITH, ANNIE LORRAIN, AND J. RAMSBOTTOM. New or rare microfungi. Trans. British Mycol. Soc. 6: 47-53. 1918.—A new genus of the discomycetes, *Discocera*, is founded on *D. lichenicola* n. sp., collected in Somerset on the thallus of a lichen. The genus resembles *Humaria* in its spore characters but has inoperculate asci, and its paraphyses branch to form a dense epithecium. Its affinity to the lichenicolous genus *Nesolechia* is suggested. *Amerosporium patellarioides* n. sp., on leaves of *Rosa canina*, *Ramularia umbrosa* n. sp. on living leaves of *Saxifraga umbrosa*, and *Volutella longepila* n. sp. on branches of *Ulix europae* are described. Notes on nearly 20 unusual species of various groups are given.—*H. M. Fitzpatrick.*

1166. SMITH, ERWIN F., L. R. JONES, AND C. S. REDDY. The black chaff of wheat. Science 50: 48. 1919.—The continued prevalence of black chaff of wheat in the United States makes it desirable to apply a Latin-scientific name to the bacterial organism causing the disease. Certain minor differences between this organism and the bacterial blight of barley are pointed out, and it is suggested that the black chaff organism, for the present at least, be distinguished as *Bacterium translucens*, var. *undulosum*. A description of the organism follows.—*A. H. Chivers.*

1167. SMITH, ERWIN F., AND LUCIA McCULLUCH. *Bacterium solanacearum* in beans. Science 50: 238. 1919.—See Bot. Absts. 4, Entry 1354.

1168. SPEARE, A. T. The fungus parasite of the periodical Cicada. Science 50: 116-117. 1919.—See Bot. Absts. 4, Entry 1361.

1169. SPEARE, A. T. On certain entomogenous fungi. Mycologia 12: 62-76. Pl. 3-5. 1920.—The genus *Hirsutella* of Patouillard is discussed and redescribed. *H. entomophila*, *H. saussurei* (Cooke) comb. nov., *H. floccosa* sp. nov., *H. citriformis* sp. nov., and *H. fusiformis* sp. nov. are the species described in this genus. *Synnematium Jonesii* gen. et sp. nov. is also described. All the forms are illustrated.—*H. R. Rosen.*

1170. STEVENS, F. L., AND NORA DALBY. Some Phyllachoras from Porto Rico. Bot. Gaz. 68: 54-59. 3 pl. July, 1919.—In addition to notes on other species, the following new species are reported: *Phyllachora banisteriae*, *P. bourreriae*, *P. canafistulae*, *P. drypeticola*, *P. gnipae*, *P. heterotrichae*, *P. mayepearae*, *P. metastelmae*, *P. nectandrae*, and *P. ocoteicola*.—*H. C. Cowles.*

1171. TAUBENHAUS, J. J. Recent studies on *Sclerotium rolfsii* Sacc. Jour. Agric. Res. 18: 127-138. Pl. 3-6, fig. 1. 1919.—See Bot. Absts. 4, Entry 1371.

1172. TEHON, LEO R. Studies on some Porto Rican fungi. Bot. Gaz. 67: 501-511. 1 pl. 1919.—A description of some miscellaneous material from the collections of F. L. STEVENS. In addition to notes on previously reported species, the following are described as new: *Meliola conferta*, *M. cestri*, *M. bayamonensis*, *M. marcgraviae*, *Phyllachora quadraspora*, *P. ischmaemi*, *Stigmatea guettardae*, *Phaeosphaerella paspali*, *Coniothyrium marisci*, *Pestalozzia lucumae*, *Acrothecium flacatum*, and *Trichostoma axonopi*.—H. C. Cowles.

1173. TURCONI, MALUSIO, AND LUIGI MAFFEI. Note micologiche e fitopatologiche. I.—Un nuovo genere di Ceratostomataceae. II.—Due nuovi micromiceti parassiti della *Sophora japonica* Linn. [Mycological and pathological notes.] Atti Ist. Bot. Univ. Pavia 2, 15: 143-149. Pl. 1. 1918.—See Bot. Absts. 3, Entry 2773.

1174. TURLEY, H. E. New fruit fungi found on the Chicago market. Science 50: 375-376. 1919.—See Bot. Absts. 4, Entry 1372.

1175. VINCENS, F. Valeur taxonomique d'une particularité de la structure des ascospores chez les Xylariacées. [Taxonomic value of peculiarities of the structure of ascospores of Xylariaceae.] Bull. Trimest. Soc. Mycol. France 34: 101-109. Fig. 1-4. 1919.—The author points out various peculiarities in the structures of ascospores of Xylariaceae which simplify the classification of these fungi. The following fungi are discussed: *Xylaria polymorpha*, *Xylaria Hypoxylon*, *Hypoxylon fuscum*, *Ustilina vulgaris*, *Xylaria hippotrichoides*, *Thamnomycetes hippotrichoides*, *Rhizomorpha tuberculosa*, *Daldinia concentrica*, *Poronia punctata*, *Nummularia discreta*, *Rosellinia Julii*, *Anthostoma atropunctatum*, *Anthostoma targidum*, *Penzigia compuncta*, *Wawelia regia*.—Fred. C. Werkenthin.

1176. VON HÖHNEL, F. Über discomyceten vortäuschende Microthyriaceen. [Microthyriaceae resembling and mistaken for Discomycetes.] Ber. Deutsch. Bot. Ges. 36: 465-470. 1918.—*Micropeziza scirpicola* Fuckel and *Discomycella tjibodensis* v.H., formerly considered true Discomycetes, belong to the Microthyriaceae. *Belonidium aurantiacum* Rehm forms the characteristic shield of the Microthyriaceae, but develops also a parenchymatous excipulum thereby constituting a transition form to the few Discomycetes which are related to the Helotiaceae. The new genera *Calycellina* and *Cenangina*, together with the three forms above mentioned, would constitute a natural group the first members of which must still be considered as belonging to the Microthyriaceae, while the last members are typical Discomycetes. *Micropeziza scirpicola* Fuckel and *Belonidium aurantiacum* Rehm are closely related and differ only in the development of the excipulum. Both are to be included in the new genus *Niesslella* of the Microthyriaceae.—Ernst Artschwager.

1177. VON HÖHNEL, F. Über den Zusammenhang von *Meliola* mit den Microthyriaceen. [Relation of *Meliola* to the Microthyriaceae.] Ber. Deutsch. Bot. Ges. 36: 471-473. 1918.—The perithecia of *Meliola* develop exactly as the perithecia of the Microthyriaceae, namely on the lower side of the subicular hyphae; there is no difference then, between a thyriothecium and a perithecium in *Meliola*. However, between the forms *Amazonia Psychotriae* and *Meliola corallina* there is a big gap. The former is a typical Microthyrium, while the latter is a true *Meliola*. An intermediate form is found in *Dimerosporium Litseae* P. Henn. which was described by Hennings as belonging to the Perisporiaceae. Sydow later put it in the new genus *Armatella*. However, *Armatella* does not develop a hypostroma as claimed by Theissen and Sydow, and the fruit body does not resemble *Polystomella* but the *Meliola* species which lack the spines of the fruit body. It is easy to understand why *Dimerosporium Litseae* was considered as belonging to the Microthyriaceae, since the description was based on unripe material and the juvenile stage of a *Meliola* is hardly distinguishable from members of the Microthyriaceae.—Ernst Artschwager.

1178. WAGER, HAROLD. A fluorescent colouring matter from *Leptonia incana* Gill. Trans. British Mycol. Soc. 6: 158-164. 1919.—Experiments show that this fungus contains two fluorescent coloring matters one yellow the other blue. These in combination give the plant a green color. A discussion of the phenomenon of fluorescence in fungi is accompanied by a list of species in which it occurs.—H. M. Fitzpatrick.

1179. WAKEFIELD, E. M. Observations on the biology of some sand-dune fungi. Trans. British Mycol. Soc. 6: 33-36. 1918.—The species *Psilocybe ammophila* Mont., *Coprinus Friesii* Quél., *Bolbitius tener* Berk., *Galera rubiginosa* Fr., *Inocybe dulcamara* Fr., and *Inocybe eutheles* B. & Br. are discussed. They were collected on the sand dunes on the Gower coast in South Wales. Field observations show that the mycelium of the fungi in some cases arises from buried leaves of dune plants. In the case of two species, however, the only apparent source of organic matter was a crust of humus formed from algae, chiefly *Oscillaria*. It is believed that careful observation will show the fungous flora of sand dunes to be extensive.—H. M. Fitzpatrick.

1180. WAKEFIELD, E. M. The Selby foray, 9th-14th September 1918, and complete list of fungi gathered during the foray. Trans. British Mycol. Soc. 6: 77-87. 1919.—A brief discussion of the interesting features of the foray is followed by a complete list of the fungi collected. A group picture showing the 33 members of the society who attended the foray accompanies the article.—H. M. Fitzpatrick.

1181. WAKEFIELD, E. M. New British fungi. Trans. British Mycol. Soc. 6: 132-134. 1919.—*Hypochnus umbrinus* (Fr.) Quél., *H. isabellinus* Fr., *Galactinia Howsei* Boud., *Helotium ciliatosporium* Boud., *Gloeosporium inconspicuum* Cav., and *Ramularia Barbaraeae* Pk. reported for the British Isles.—H. M. Fitzpatrick.

1182. WAKEFIELD, E. M. Charles Ogilvie Farquarson. Trans. British Mycol. Soc. 6: 236-237. 1919.

1183. WAKEFIELD, E. M., AND A. A. PEARSON. Resupinate hymenomycetes from the neighborhood of Weybridge, Surrey. Trans. British Mycol. Soc. 6: 68-75. 1918.—*Tulasnella tremelloides* n. sp. is described and figured. *Protodontia uda* v. Hoehn., and a number of species of *Corticium*, *Peniophora*, *Hypochnus*, *Coniophora*, *Odontia*, *Poria*, etc., are cited with critical notes and figures. Six species and two genera are new to the British Isles. [See next following Entry, 1184.]—H. M. Fitzpatrick.

1184. WAKEFIELD, E. M., AND PEARSON A. A. Additional resupinate hymenomycetes from the Weybridge district. Trans. British Mycol. Soc. 6: 136-143. 1919.—Notes are given on collections of *Platyglœa effusa* Schroet., and various species of *Corticium*, *Peniophora*, *Hypochnus*, *Grandinia*, *Odontia*, *Radulum*, *Solenia*, *Merulius*, *Hydnum* and *Poria*. No new species listed. [See next preceding Entry, 1183.]—H. M. Fitzpatrick.

1185. WAKSMAN, SELMAN A. Studies in the metabolism of Actinomycetes. II. Jour. Bact. 4: 307-330. 1919.—See Bot. Absts. 3, Entry 2860.

1186. WALKER, LEVA B. Development of *Pluteus admirabilis* and *Tubaria furfuracea*. Bot. Gaz. 68: 1-21. 8 fig., 5 pl. 1919.—The basidiocarp primordium of *Tubaria* consists of loosely interwoven hyphae of uniform size; the primordium of *Pluteus* was not obtained. In *Tubaria* the development of the fruit body is endogenous, a well-defined blematogen surrounding it while young. In *Pluteus* the development is exogenous, and there is a strong epinastic development in the margin of the pileus; the gills originate as downward growing folds which develop centrifugally. In *Tubaria* the development is also centrifugal, the gills originating as radial folds in a previously uniform palisade layer. The cystidia of *Pluteus* are formed terminally on filaments similar to those that bear the smaller cells of the hymenial layer; these filaments eventually become branched. Upon the expansion of the trama of *Pluteus* large elongated cells from the subhymenium grow inward and downward, giving the

trama a very unusual appearance; these cells probably represent internal cystidia. In *Tubaria* the surface of the pileus is never clearly defined; the marginal veil, made up of two layers, is so delicate that it soon disappears. The cells of the young *Pluteus* basidiocarps are constantly binucleate.—H. C. Cowles.

1187. WENNER, JOHN J., AND LEO F. RETTGER. A systematic study of the *Proteus* group of bacteria. Jour. Bact. 4: 331-353. 1919.—In this study eighty-four strains of the *Proteus* group were obtained. Various morphological and cultural tests were made upon the different strains and the following conclusions reached: The group may be divided into two genera, *Proteus* and *Zopfius*, the latter a new genus. Two species are included in the first, *P. vulgaris* and *P. mirabilis*, and one in the second, no name being suggested for this species.—Chester A. Darling.

1188. WEST, ERDMAN. An undescribed timber decay of hemlock. Mycologia 11: 262-266. 1919.—*Polyporus tsugae* (Murr.) Overholts is found to be a rot producer of dead hemlock timber. It attacks the sap and heart-wood destroying both cellulose and lignin. The fungus, which is fully described, is shown to be different from *P. lucidus* and *P. curtisii*.—H. R. Rosen.

1189. WHELDON, HAROLD J. Observations on the fungi of the Lancashire and Cheshire sand-dunes. Trans. British Mycol. Soc. 6: 143-148. 1919.—A considerable number of species of hymenomycetes, gastromycetes, and discomycetes are listed. The opinion is expressed that the roots and other buried remains of *Agropyron* and *Ammophila* provide the means of sustenance.—H. M. Fitzpatrick.

1190. WILSON, MALCOLM. Some British rust fungi. Jour. Botany 57: 161-163. 1919.—In this journal, in 1915, an account was given of the occurrence of several alpine species of *Uredineae*. The present paper supplies additional information on some of these, and records the occurrence of several others. The uredo- and teleutospore stages of *Melampsora alpina* Juel occur on *Salix herbacea*, and the aecidial stage of *Saxifraga oppositifolia*. This stage has been known as *Coeoma Saxifragae* Went. A long description of this species is given. The discovery of the aecidial stage clears up any doubt as to the distinctness of this fungus from *Melampsora arctica* Rost. The aecidial stage of *Puccinia borealis* was discovered by Greville on Ben Voirlich in 1821, and has been the only recorded British station. It is now recorded from Ben Lui on *Thalictrum alpinum*. Juel showed that the uredospore and teleutospore stages occur on *Argostis borealis*. *Authoxanthum orodatum* may be another host. Infection experiments are to be carried out to determine whether this species of grass is indeed another host. *Puccinia Polygoni-vivipari* Karst. was found on *Polygonium viviparum* in Perthshire in 1915. The uredo- and teleutospore stages of *P. septentrionalis* are also found on *Polygonium viviparum*, but at higher altitudes. The distinguishing marks of the two species are given. *P. Polygoni-vivipari* appears to be autoecious. *Uromyces Onobrychidis* Lev. was found in Kent in cultivated sanfroin. It has not previously been reported from Great Britain. The characters are given. Teleutospores had not been found in British specimens of *Puccinia Hypochaeridis* Oud. up to the present time. They were discovered, along with uredospores, on *H. radicata* at Epsom in 1916. *Puccinia Crepidis* Schrot. was found on *Crepis virens* in Perthshire in 1915. The aecidial stage of *P. uliginosa* Juel occurred on *Parnassia palustris* in Argyllshire in 1915. *P. major* Dietel was found on Ben Voirlich in 1915 in aecidial condition where it occurred on *Crepis paludosis*. A correction is made of spore measurements of *P. Prostii* given in Jour. Bot. 53: 44. 1915.—K. M. Wiegand.

1191. WOLF, CHARLES G. L. Contributions to the biochemistry of pathogenic anaerobes. VI. The proteolytic action of *Bacillus sporogenes* (Metchinkoff) and *Bacillus welchii*. Jour. Path. and Bact. 22: 270-288. 1919.—See Bot. Absts. 4, Entry 1524.

1192. WOLF, CHARLES G. L. Contributions to the biochemistry of pathogenic anaerobes. VII. The biochemistry of *Bacillus proteus*. Jour. Path. and Bact. 22: 289-307. 1919.—See Bot. Absts. 4, Entry 1551.

1193. YASUDA, ATSUSHI. Zwei neue arten von Polyporus. [Two new species of Polyporus.] Bot. Mag. Tokyo 33: 139-142. 4 fig. 1919.—*Polyporus tsunodae* Yasuda, from the province Kozuke, and *Polyporus greeni* Yasuda, from the province Settsu, Japan.—L. R. Abrams.

1194. YASUDA, ATSUSHI. Eine neue Arte von Coniophora. [A new species of Coniophora.] Bot. Mag. Tokyo 33: 155-156. 1 fig. 1919.—Grows on dead stems of *Pasania cuspidata*, in the province of Awaji.

1195. YASUDA, ATSUSHI. Notes on fungi (85). (In Japanese.) Bot. Mag. Tokyo 33: 54-55. 1919.—Refers to *Coniophora matsuzawae* Yasuda sp. nov., *Dermatea cerasi* (Pers.) de Not., and *Xylaria obovata* Berk.—L. L. Burlingame.

1196. YASUDA, A. Notes on fungi (87). (In Japanese.) Bot. Mag. Tokyo 33: 112-114. 1919.—Refers to *Stereum bovinense* = *Hymenochaete bovinensis* Yasuda sp. nov.; *Hydnum violascens* Alb. et Schw.; and *Tomentella fusca* (Pers.) Schrot.—L. L. Burlingame.

1197. YASUDA, A. Notes on fungi (88). (In Japanese.) Bot. Mag. Tokyo 33: 140-141. 1919. Refers to *Polyporus greeni* Yasuda sp. nov.; *Stereum rimosum* Berk.; and *Clavaria amethystina* (Holmsk.) Bull.—L. L. Burlingame.

1198. YASUDA, A. Notes on fungi (89). (In Japanese.) Bot. Mag. Tokyo 33: 167-169. 1919.—Refers to *Polystictus scopulosus* Yasuda sp. nov.; *Coniophora arida* (Fr.) Cooke; and *Hypocrea citrina* (Pers.) Fr.—L. L. Burlingame.

1199. ZELLER, S. M., AND C. W. DODGE. Arcangeliella, Gymnomycetes, and Macowanites in North America. Ann. Missouri Bot. Gard. 6: 49-59. Fig. 1-3. 1919.—Descriptions of the species occurring in North America are given, together with original descriptions of extralimital species. *Arcangeliella caudata*, *Gymnomycetes Gardneri* and *Macowanites echinosporus* are described as new. *Hydnangium Soderstromii* Lagerheim is newly combined as *Arcangeliella Soderstromii* (Lagerh.).—S. M. Zeller.

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. BERRY, Editor

1200. ANONYMOUS. [Rev. of: SEWARD, A. C. Fossil plants, vol. IV., Ginkgoales, Coniferales and Gnetales. Cambridge University Press: Cambridge, England, 1919. xvi + 544 p. 190 illus.] Jour. Botany 57: 323-324. 1919.

1201. ANONYMOUS. Plant fossils and the past. Sci. Amer. 120: 360. 1919.

1202. BERRY, E. W. The history of the linden and ash. Plant World 21: 163-175. 3 fig. July, 1918. 1919.—An account of the present distribution and the geological history of the genera *Tilia* and *Fraxinus*.—E. W. Berry.

1203. CHAMBERLAIN, C. J. Bennettitales. [Rev. of: STOPES, MARIE C. New Bennettitacean cones from the British Cretaceous. Phil. Trans. Roy. Soc. London B208: 389-440, 6 pl. 25 fig. 1918.] Bot. Gaz. 67: 375-376. 1919.—See also Bot. Absts. 1, Entry 594.

1204. DOLLEFUS, G. F., AND P. MARTY. Découverte d'un gisement fossilifère dans le Cantal. [Discovery of a fossiliferous deposit in the Cantal.] Compt. Rend. Acad. Sci. Paris 167: 534. Oct., 1918.—Records freshwater shells, mammalian and fish bones and seeds of Umbelliferae, Rosaceae, Compositae, and Scrophulariaceae from a lignitic clay in an andesitic agglomerate at Pont de Gail in the Goul valley, Cantal, France, of lower Pliocene (Plaisancian Age).—E. W. Berry.

1205. FLORIN, R. Eine übersicht der fossilen *Salvinia*-arten mit besonderer berücksichtigung eines fundes von *Salvinia formosa* Heer in Tertiär Japans. [A review of the fossil species of *Salvinia* with special reference to a discovery of *Salvinia formosa* Heer in the tertiary of Japan.] Bull. Geol. Inst. Upsala 16: 243-260. 11 pl. 1919.—Records *Salvinia formosa* Heer from the late Tertiary of Japan and passes in critical review the various fossil species in the literature of paleobotany.—Ten are recognized from strata ranging in age from Eocene to Pliocene and covering North America, Europe and Asia. *S. elliptica* Newberry is given as from the Upper Cretaceous of Washington State. It really comes from the Eocene Puget group.—E. W. Berry.

1206. GOTHAN, W. Das Alter der Karbonformation nördlich der Roer und Allgemeines über Horizontierung im Karbon mit Hilfe der Flora. [The age of the coal deposits north of the Roer, and generalizations concerning stratification in coal by means of the flora.] Glückauf 55 Jahrg. No. 26. 477-483. June 28, 1919.

1207. GOTHAN, W. Über einen interessanten Pteridospermenfund. [Discovery of an interesting Pteridosperm.] Zeits. Deutsch. Geol. Gesell. 71: 14. 1919.—Records a specimen of *Sphenopteris dicksonoides* Göppert from the Carboniferous of Lower Silesia with seeds and cupules of *Lyginopteris* type, and a specimen of *Sphenopteris adiantoides* Schlotheim (*elegans* of authors) with Telangium or Calymmotheca cupules or microsporangia.—E. W. Berry.

1208. GOTHAN, W. On the *Taeniopteris multinervia* of Meister. Zeits. Deutsch. Geol. Gesell. 71: 12-13. 1919.—Suggests that this form which the author thought was a *Glossopteris* is really an *Acrostichum* and the deposits in which it was found are Tertiary in age instead of Paleozoic.—E. W. Berry.

1209. GOTHAN, W., AND E. ZIMMERMAN. Pflanzliche und tierische fossilen der deutschen Braunkohlenlager. [Plant and animal fossils of the German brown coal deposits.] 54 p., 41 fig. Halle (Saale). 1919.—A well illustrated popular account of the fossils found in and associated with the brown coal deposits of Germany. Thirty pages and 24 figures are devoted to the more interesting fossil plants that have contributed to the formation of the coal. The remainder of the booklet is devoted to the shells, insects and vertebrates of the deposits.—E. W. Berry.

1210. HARDER, E. C. Iron-depositing bacteria and their geologic relations. U. S. Geol. Surv. Prof. Paper 113. 89 p. 14 fig., 12 pl. 1919.—Presents the carefully digested results of field and laboratory studies of springs, bogs, mine and stream waters by a geologist who has had exceptional opportunities of studying the iron ore deposits of different parts of the world and who has been especially interested in their mode of origin, especially the enormous amounts of sedimentary ores, bog ores and surface concentrations, the origin of which has usually been attributed to the inadequate processes of simple oxidation and precipitation from ferrous solutions; since about 90 per cent of the present iron production comes from these sources the question of origin is one of great economic importance. It is of great interest to the student of earth history and also to the students of plant evolution and history, since these types of ores are common at all geological horizons and are especially prominent in the pre-Cambrian as in the Lake Superior region, in Minas Geraes, Brazil, and in India. Biologists are much interested in the bearing upon evolutionary problems of the possible occurrence in early geologic times of bacteria and similar organisms. Mr. Harder concludes that there are three principal groups of iron-depositing bacteria—(1) those that precipitate ferric hydroxide from solutions of ferrous bicarbonate, using the carbon dioxide for metabolic energy; (2) those that do not require ferrous bicarbonate for their vital processes but cause the deposition of ferric hydroxide when either inorganic or organic salts are present; and (3) those that attack iron salts of organic acids using the acid radicle and leaving the ferric hydroxide or basic ferric salts. Not only are the higher so-called thread bacteria found to be widely distributed in nature but the author shows that many of the more primitive bacteria are concerned in the rôle of iron precipitation.—The paper, in addition to the new facts recorded, constitutes a critical summary of previous work and a full bibliography. [See Bot. Absts. 4, Entry 1106.]—E. W. Berry.

1211. KNOWLTON, F. H. A catalogue of the mesozoic and cenozoic plants of North America. Bull. U. S. Geol. Surv. 696. 815 p (1919.) 1920.—Contains a bibliography, an alphabetical list of species under their appropriate genera, also alphabetically arranged, with citations of generic types, citations and occurrences for species, list of genera arranged botanically and lists of floras of different geological formations arranged chronologically. An invaluable reference work brought up to 1919.—E. W. Berry.

1212. KRYSHTOFOVICH, A. On the flower of *Williamsonia* sp., found near Vladivostok, and some other fossil plants from the maritime province of Asiatic Russia. Jour. Geol. Soc. Tokyo 26: 1-5. 2 fig. Nov., 1919.—Records the following Jurassic plants from Vtoraya Riechka, 9 km. north of Vladivostok: *Onychiopsis elongata* Yok., *Cladophlebis denticulata* Font., *Laccopteris Dunkeri* Schenk, *Sagenopteris* of *Mantellii* Schenk, *Nilssonia orientalis* Heer, *Dioonites* cf. *Ketoï* Yok., *Williamsonia* sp., *Podozamites lanceolatus* L. & H., *Elatocladus subzamioides* Möller and *Brachyphllum* sp.—A second Jurassic locality at Brashnikova Bay near Okeanskaya, about 20 km. north of Vladivostok furnished *Onychiopsis elongata* Yok., *Klukia exilis* Racib. and *Equisetites* cf. *Yakoyami* Sew.—A third locality on the Japan Sea south of Cape Bielkin is of Tertiary age and has furnished a five petalled flower, an *Acer* samara and leaves of *Fagus*, *Juglans*, *Alnus* and *Grewia*.—E. W. Berry.

1213. LAURENT, L. Addition à la flore fossile des schistes de Ménat (Puy-de-Dôme). [Addition to the fossil flora of the Ménat shale (Puy-de-Dôme).] Ann. Mus. Hist. Nat. Marseille 17: 3-8. 1 pl. 1919.—Describes *Calamopsis pomeli* sp. nov. from the Oligocene bituminous shales of Ménat in central France.—E. W. Berry.

1214. LAURENT, L. Les Liquidambars. Essai de filiation des formes actuelles et fossiles du genre Liquidambar. Synthèse du genre. [The liquidambars. Relationships of recent and fossil forms of the genus Liquidambar. A synthetic treatment of the genus.] Ann. Mus. Hist. Nat. Marseille. 17: 9-27. Pl. 2, 3. 1919.—Discusses the characters and the peculiar distribution of the recent species, critically reviews the various fossil species which have been described and concludes that the genus originated in the Arctic region from which it spread southward in all directions, that *L. europaeum* Heer is the single specific type throughout the Tertiary, the described forms being merely varieties of this form which gave origin to the single existing specific type, namely *L. styraciflua* L. of which *L. orientalis* Mill. and *L. formosana* Hance and other Asiatic mutants are merely geographic varieties or post glacial isolated remnants of a previously Holarctic distribution.—E. W. Berry.

1215. MARTY, P. Un fruit fossile de Lezoux (Puy-de-Dôme). [A fruit fossil from Puy-de-Dôme.] Rev. d'Auvergne ann 1919: 1-17. 4 fig.—Records well preserved fruits from the middle Stampian of Lezoux which are considered identical with *Cucumites variabilis* described by BOWERBANK from the much earlier Ypresian of the London Basin. Extended comparisons are made with various species that have been referred to the genus *Apeibopsis* Heer.—E. W. Berry.

1216. MOODIE, R. L. Thread moulds and bacteria in the Devonian. Science, n.s. 51: 14-15. Jan. 2, 1920.—An examination of the enlarged and distorted lacunae in the bony carapaces of the fish-like forms *Bothriolepis* and *Cocosteus* from the Devonian show the unmistakable activity and probable presence of thread moulds (*Mycelites*) and bacteria (*Micrococcus*). Apriori reasons were convincing for regarding these lowly organisms as present in great abundance in the older rocks but none have been recorded in the long interval between the pre-Cambrian occurrences described by Walcott and the Carboniferous forms described by Renault, so that the present contribution helps to bridge this gap in the record.—E. W. Berry.

1217. NATHORST, A. G. [Rev. of: ANTEVS, E. Die liassische flora des Horsandsteins. (Liassic flora of Hör sandstone.) K. Sv. Vet. Akad. Handl. 59.^s 1919.] Geol. Fören. Förhandl. 4: 524-527. 1919.

1218. PETRONIEVICS, B. La loi de l'évolution non corrélative. [The law of non-correlative evolution.] Rev. Gen. Sci. Pures et Appliquées 30: 240-242. 1919—Discussion of the so-called law, based on zoological and paleontological material.—G. J. Peirce.

1219. WALCOTT, C. D. Middle cambrian algae. Smith. Misc. Coll. 67: 217-260. Pl. 43-59. 1919.—A continuation of the author's extensive paleontological studies of the Burgess shale of British Columbia of Middle Cambrian age. All of the forms are preserved as thin films in the shale and consequently their essential features are largely obscured. All are considered to have been planktonic forms and all are described as new species. They confirm the view that the algae as a whole have undergone but slight change during the millions of years of their history. Following are the forms described with their taxonomic position:

Cyanophyceae

Order Hormogoneae

Family Nostocaceae

Morania confluens
Morania costellifera
Morania elongata
Morania fragmenta
Morania frondosa
Morania (?) *globosa*
Morania parasitica
Morania (?) *reticulata*
Marpolia spissa
Marpolia aequalis

Chlorophyceae

Yuknessia simplex

Rhodophyceae

*Waputikia ramosa**Dalyia nitens**Dalyia racemata**Wahpia insolens**Wahpia mimica**Wahpia virgata**Bosworthia radians**Bosworthia gyges*

Calcareous Algae

Sphaerocodium (?) *praecursor**Sphaerocodium* (?) *cambria*

—E. W. Berry.

1220. WORSDELL, W. C. The origin and meaning of medullary (intraxylary) phloem in the stems of dicotyledons. II. Compositae. Ann. Botany 33: 421-458. 1919.—See Bot. Absts. 4, Entry 1006.

PATHOLOGY

G. H. COONS, *Editor*C. W. BENNETT, *Assistant Editor*

1221. AMOS, ARTHUR. The difficulties of growing red clover. Clover sickness and other causes of failure. Jour. Roy. Agric. Soc. England 79: 63-88. 5 fig. 1918.—See Bot. Absts. 4, Entry 1.

1222. ANONYMOUS. Wart disease of potatoes order, 1918, and inspection of immune crops. Jour. Bd. Agric. Great Britain Suppl. 18: 114-115. 1919.—The planting of varieties of potatoes susceptible to the wart disease (*Synchytrium endobioticum*) in districts that have been certified as "infected areas" is prohibited by an order of the Board of Agriculture in 1918. To provide seed of immune varieties reasonably free from "rogues" for use in these infected areas, arrangements were made by the Board for the growth under careful field inspection and roguing of nine immune varieties of potatoes in Scotland. Under this arrangement over 4000 acres of potatoes were inspected of which 3650 passed the standard prescribed for the issue of a certificate. Where the crop was satisfactory a certificate was issued to the effect that the potatoes were of the variety specified, true to type and reasonably free from "rogues." The vendor of this inspected seed is obliged to quote the number of the certificate on the invoice on all sales. The lack of an adequate supply of First Early varieties immune from wart disease presents a serious difficulty now but it is anticipated that this difficulty will be entirely overcome by 1921.—M. B. McKay.

1223. ANONYMOUS. **Root-knot trouble in fruit trees.** Jour. Dept. Agric. South Australia. 22: 535-536. 1919.—A root-knot trouble affecting the peach, almond, prune and pear trees. The trees become stunted and ultimately die, especially if attacked the first few years after planting. The disease is most severe on sandy soil. The galls appear to be annual in character, vary greatly in size and are about the texture and color of a toughened turnip root. The disease is now under investigation by the departmental pathologist.—*Anthony Berg.*

1224. ANONYMOUS. **Yellow-leaf disease in *Phormium tenax*.** New Zealand Jour. Agric. 19: 89-93. 1919.—This article deals with a report made by L. COCKAYNE. The affected plants have very distinctly yellowed leaves due to the fact that many of the roots are decayed. After 14 months study he concluded that the disease was due to a fungus or to bacteria. R. WATERS of the Biologist's office has isolated a fungus, but its parasitism has not been proved. A study of selected plants in various locations has shown that the disease is favored by stagnant water about the roots, that diseased plants may recover, and that there is very strong probability that the selection of resistant plants from badly infested areas may be the best method of procedure.—*N. J. Giddings.*

1225. ANONYMOUS. **Fungi from Singapore and Penang.** "Fungi Singaporensis Bakeriani." Gardens' Bull. Straits Settlements 2: 116-120. 1919.—See Bot. Absts. 4, Entry 1050.

1226. ANONYMOUS. **Hints on storing timber to prevent decay.** Sci. Amer. 120: 339-360. 1919.

1227. ANONYMOUS. ***Echinodia theobromae* Pat.** [English translation from French.] Gardens' Bull. Straits Settlements 2: 144-145. 1919.—See Bot. Absts. 4, Entry 1051.

1228. ANONYMOUS. **Starkes Auftreten des grünen Eichenwicklers (*Tortrix viridana* L.) in der Wiener gegend.** [Attacks of green oak roller (*Tortrix viridana* L.) in the Vienna region.] Oesterreich. Forst- u. Jagdzeitg. 1924: 303. November 21, 1919.—Notice of heavy attacks of *Tortrix viridana* on oak stands in the sandstone region of the Vienna forest. The increased intensity is laid to caterpillars which injured the leaves, followed by a mildew that destroyed the leaves that appeared in summer following caterpillar attack. This led to a congestion of sap in the roots owing to the reduction of leaf (transpiring) surface, which encouraged attacks of *Agaricus melleus*. The trees thus weakened formed favorable hosts to the Tortrix.—*F. S. Baker.*

1229. ANONYMOUS. **Paste which preserves watermelons.** Sci. Amer. 121²: 299. 1919.—The paste described furnishes complete protection to the stem end of the watermelon, a point of possible decay during transit. It is made by dissolving 4 ounces bluestone in 2 pints boiling water and thoroughly mixing with a paste consisting of 3 ounces powdered alum and 4½ ounces rye flour in 1 pint of water. The mixture is cooked for 5 minutes, cooled and strained through cheese-cloth, and is dyed green with pistachio green before using.—*Chas. H. Otis.*

1230. ANONYMOUS [Dodge, B. O.]. **Index to American mycological literature.** Mycologia 11: 323-326. 1919.

1231. ANONYMOUS [Dodge, B. O.]. **Index to American mycological literature.** Mycologia 12: 55-58. 1920.

1232. ARNOLD, GEO. **Stem rot of the aster.** Florists' Exchange 48: 349. 1919.—On Aug. 2, aster fields near Rochester, N. Y., showed discouraging prospects for seed and for cut flowers. With one exception all the fields were more or less damaged by stem rot [*Fusarium* sp.]. This was particularly true of the early varieties; and the plants of all varieties were stunted by the work of the tarnished plant bug. Though it is believed that the infection of the stem rot is carried over in the soil, one field on which asters had not been grown before was seen to be hard hit by the rot. A probable contributing cause was a heavy coating of

stock yard manure applied the spring before. Probably in most of the cases seen the plants might have escaped serious injury from stem rot if they had not had their growth checked by unfavorable conditions of soil, and the ravages of the tarnished plant bug. There is a decided difference in the susceptibility of the various types of asters to stem rot. It might be possible to select strains from the more resistant sorts that would be practically immune.—*L. A. Minns.*

1233. ATANASOFF, D., AND A. G. JOHNSON. Treatment of cereal seeds by dry heat. Jour. Agric. Res. 18: 379-390. Pl. 48-49. 1920.—Preliminary data indicate that seed of the cereals—barley, wheat, rye and oats—when of good quality and well dried will withstand protracted exposure to dry heat at comparatively high temperature (30 hours at 100°). *Bacterium translucens*, causing blight of barley, and *Pseudomonas avenae*, causing blight of oats, are killed by baking at a temperature which is not injurious to the seed. The following seed-borne fungous diseases are practically eliminated, so far as primary infection is concerned, by the treatments: wheat scab (*Gibberella saubinetii* and *Fusarium* spp.) and spot blotch of barley (*Helminthosporium sativum*). Net blotch (*H. teres*) and stripe disease (*H. gramineum*) of barley, blotch of oats (*H. avenae-sativae*), loose smut of barley and the smuts of oats are reduced very materially by the treatment.—*D. Reddick.*

1234. BAHR, FRITZ. A sure cure for damping off. Florists' Exchange 47: 356. 1919.—Mix the soil for seed sowing, soak thoroughly with formaldehyde at the rate of one fluid ounce to a quart of water, and let dry out before using; also soak pans, pots and drainage crock in the same solution.—*L. A. Minns.*

1235. BAKER, C. F. Hevea versus fungi. Gardens' Bull. Straits Settlements 2: 109-113. 1919.—Twenty-eight fungi are listed which are found associated with *Hevea brasiliensis*, *Hevea* or Para rubber; ten of the fungi were found to be new species and one a new genus, the determinations of the author's collections being made by Saccardo. Emphasis is placed upon the importance of adequate investigation of fungous diseases of this tree.—*S. F. Trelease.*

1236. BAKER, C. F. Mango pests in Singapore. Gardens' Bull. Straits Settlements 2: 115-116. 1919.—Mangoes are severely attacked by three pests: a psyllid, and two fungi—*Meliola mangiferae* and *Zimmermanniella trispora*.—*S. F. Trelease.*

1237. BALL, E. D. The potato leafhopper and the hopperburn. Phytopath. 9: 291-293. 1919.—The burning and upward curling of the tips and margins of foliage of potato and other hosts is attributed to the work of leafhopper (*Empoasca mali*). Eggs are deposited in the midrib of the leaf from which nymphs emerge in a week or two. The injury to the veins causes death of the margins. Plants caged with the insects showed burn after three days while in infected plants caged free from insects recovered. The injury was widespread in 1918 and in all cases examined leafhoppers were associated with the injury which appeared in certain rows and varieties rather than according to sun exposure or soil conditions. Black-Leaf-40, 1:800 with the addition of 5 parts of soap proved an effective spray.—*Maude Miller.*

1238. BATCHELOR, L. D., AND H. S. REED. Winter injury or die-back of the walnut.—California Agric. Exp. Sta. Circ. 216. 20 p. 1919.—See Bot. Absts. 4, Entry 898.

1239. BAUMANN, E. Zur Frage der Individual- und der Immunitäts-Züchtung bei der Kartoffel. [Individual selection and immunity breeding in potatoes.] Fühl. Landw. Zeitg. 67: 246-253. 1918.—The first step in improving potato culture consists in selecting from among the very numerous varieties certain ones which are high yielders and which possess high resistance. This is most satisfactorily accomplished by separating varieties into vegetative lines which permit testing of the hereditary characters of both normal and pathological nature; this leads to a better knowledge of certain varieties and provides data which are of direct value in special breeding work. Experimental data covering a number of years are presented in support of the conclusion.—*Ernst Artschwager.*

1240. BERNARD, CH. Aanvullende mededeelingen over de wortelziekten van de thee. [Supplementary contribution to the root diseases of tea.] Mededeel. Proefstat. voor Thee [Buitenzorg] Dept. Landb., Nijverheid en Handel 61a: 1-7. Pl. 1-10 (2 colored). 1919.—This paper which is a supplement to No. 61 gives the illustrations and additional notes. Numerous cases of partial or entire recovery were found from root-collar attacks by *Ustulina zonata*. Generally, however, a plant attacked by any of the root parasites is lost and effort must be directed to protect the neighboring bushes. Frequent combination of the different fungi on the same plant is recorded. Thus on high lying estates *Armillaria mellea* is associated with *Rosellinia bothrina*, while on the lower lying estates *Ustulina zonata* is found with the *Rosellinia*. In Sumatra the *Rosellinia* with *Poria hypolateritia* or *Rosellinia* with *Fomes* commonly occur. Detailed notes on the symptoms of the various diseases are given in explanation of the plates.—R. D. Rands.

1241. BIFFEN, R. H. Annual report for 1918 of the botanist. Jour. Agric. Roy. Soc. England 79: 254-258. 1918.

1242. BOBILIOFF, W. Over de oorzaak der bruine binnenbastziekte van Hevea Brasiliensis. [The cause of brown bast disease of Hevea Brasiliensis.] Arch. Rubberecult. Nederlandsch-Indië 3: 172-178. 1919.—The brown bast disease is not caused by a parasite but seems to be of definite non-parasitic nature. The severity of the disease depends upon the general physiological conditions of the tree. The slightest trace of this disease in the bark may be shown by the phloroglucin reaction. As the disease develops anatomical changes can be noted in the bark: the formation of a brown degeneration substance in the intercellular spaces and middle lamellae of the cortex cells giving the principal reactions of lignin; the abnormal formation of stone cells; and the formation of burs.—W. E. Cake.

1243. BOKURA, U. A bacterial disease of lily. Ann. Phytopath. Soc. Japan 1²: 36-90. Pl. 1-2. 1919.—The disease is the cause of great loss in many lily-growing regions in Japan. When the organisms attack the subterranean parts of the plant, growth of the young plant is greatly retarded, and the first apparent symptoms appear on the stem as pale brown stripes, which enlarge in area and finally result in damping off. If infection takes place upon the leaves or the stems, especially on the cut surface of the latter, brownish discoloration appears on the affected parts, the leaves falling off prematurely one after another. Plants attacked in that manner may not survive. *Lilium tigrinum*, *L. auratum*, and *L. venustum* are listed as most susceptible, and *L. speciosum* is considered to be most resistant. Outbreak of the disease is greatly predisposed by excess of nitrogenous manure and of moisture. The organism as an actively motile rod with 6 to 8 peritrichiate flagella, $0.8-1.0 \times 0.6-0.7 \mu$. Cultural characteristics and proofs of pathogenicity are described at length. Reduction of nitrate, production of ammonia, hydrogen sulphide and indol, presence of cytase, oxidase and trypsin are qualitatively demonstrated. Optimum growth occurs at 32° to 34°C.; exposure for 3 minutes at 50°C. kills the organisms, while freezings are not so harmful. The parasite is not very sensitive to direct sunlight and disinfectants. The control measures are outlined, the most promising methods consist in the rotation of crops, in the avoidance of infected bulbs, in soil disinfection with formalin, and in spraying with Bordeaux mixture. Excess of nitrogenous manure should be avoided, balanced fertilizers being recommended. The name *Bacillus Lilii* Uyda is proposed for this organism.—T. Matsumoto.

1244. BOTTOMLEY, AVERIL MAUD. A preliminary investigation into a disease attacking young Cupressus plants. South African Jour. Sci. 15: 613-617. Pl. 18-21. 1919.—As a result of inoculation and cultural experiments in 1915, a *Phoma* was established as the cause of a serious disease in young plants of *Cupressus* sp. This has recently been identified with a *Phoma* on red cedars described by HAHN, HARTLEY AND PIERCE. The disease is characterized by discoloration of the twigs, followed by withering and death, the pycnidia of the fungus being visible on the dead leaves and twigs as small black dots. The cultural and morphological characters of the fungus are described in detail. Injured *Cupressus* plants readily

became infected with the *Phoma* sp. within a few days, but uninjured plants only after some weeks. Spraying with Bordeaux mixture is recommended as a control measure.—*E. M. Doidge*.

1245. BOULGER, G. S. [Rev. of: RANKIN, W. H. *Manual of tree diseases*. Macmillan Co.: New York, 1919. *xx+398 p., 70 fig.*] *Jour. Botany* 57: 165-167. 1919.

1246. BRANDES, E. W. *Banana wilt*. *Phytopath.* 9: 339-390. 13 pl., 5 fig. 1919.—In any given region the wilt affects most severely the variety of banana most widely planted there. The range of this disease coincides in general with that of the cultivated banana. Sudden, vivid yellowing of the outer or lower leaf blades and petioles, decided dwarfing of the entire plant, and longitudinal splitting of the outer leaf bases are all symptoms of the disease, brought on by varying conditions. The disease changes the color of the stelar tissue of the rhizome. A careful description of sporodochia, conidia, mycelium and cultural characteristics of *Fusarium cubense* is given, and methods of isolation are described. Temperature, moisture, light, and oxygen supply relations were determined experimentally. Banana wilt is probably the results of toxic excretions by the fungus, *Fusarium cubense*, which has been shown to be the cause of the disease. Inoculum consists of macroconidia and microconidia. Dissemination is mostly carried on by air currents, water, mud, and infected leaves used for protecting bunches packed in cars for shipment. Infection courts are two in number, the wound on the rhizome where the sucker is cut off, and the side of the bulb where a root is given off. Penetration is by means of a germ tube. Growth is intracellular. The severity as well as the spread of banana wilt is strikingly correlated with certain well defined weather conditions. Arid regions where irrigation is necessary are entirely free from banana wilt. Exclusion, eradication, and immunization are suggested as control measures.—*R. G. Bitterman*.

1247. BRANDES, E. W. *The mosaic disease of sugar cane and other grasses*. U. S. Dept. Agric. Bull. 829. 26 p., 1 pl. (colored), fig. 1-5. 1919.—The mosaic disease of sugar cane is similar to that commonly found on the tomato, potato, bean, tobacco and cucumber and is defined as an "infectious chlorosis." Although common in cane fields of Argentine, Java, Cuba, and the Hawaiian Islands for some time, mosaic appeared in Porto Rico about 1916 and has since spread to three-fourths of the fields of this Island. Losses incurred have ranges as high as nearly 50 per cent decrease in tonnage. Survey of the cane areas of the Gulf States of the United States show several limited areas of infection in Louisiana, Mississippi, Georgia and Florida.—Characteristic symptoms of mottling and striping are described as present in the leaves. In more advanced stages there is a tendency toward dwarfing and yellowing of the plant though the plant is seldom actually killed. Injuries similar to mosaic but induced by environmental, fungous and bacterial agencies are also described.—More than a thousand varieties including all the leading commercial ones in the United States are susceptible. Nearly all varieties of Cuba and Hawaiian Islands are susceptible. Many Japanese varieties, notably Kavangire and Cayuna 10 are entirely immune. Corn, sorghum, rice, millet, crabgrass, foxtail and *Panicum* have proved to be hosts to mosaic of the same identity. The wild grasses commonly associated with cane seem to be immune. The disease is due to some virus or inoculum and not to such previously suggested causes as worn out soils, climatic conditions, "run-out" varieties and bud variations. Infectiousness of mosaic is probably due to insect carriers and the incubation period ranges from two to three weeks. Infection is not thought to be by simple contact of plants.—Commonly transmitted through the planting of diseased seed pieces and no indication that contagion persists in the soil. Seed disinfection with Bordeaux mixture or corrosive sublimate has not been effective. Fertilizers and liming also not effective. Control measures which have proved efficient and which are now advocated are: selection of healthy seed plants, use of clean seed and resistant varieties, inspection of and roguing of diseased plants from slightly infected fields, exclusion of infected seed stock from healthy cane areas and the eradication of the disease in areas of recent infection.—*E. V. Hardenburg*.

1248. BRIOLI, J. Zur Feststellung der *Ustilago nuda* im embryo der Gerste. [Determination of *U. n.* in the embryo of barley.] Fühl. Landw. Zeitg. 67: 336-337. 1918.—Mycelium of *U. nuda* is easily detected in the scutellum where it is abundant. The difficult part is to get thin sections. To do this remove seed coat with scalpel and cut off a tangential section 5 mm. deep. Then make thin sections with razor. Mount sections in concentrated solution of chloral hydrate.—It is thus possible to secure infected but viable seed for experimental purposes.—Affected barley tissue transferred to slices of potato yields a fungus which apparently is *U. nuda*, but it has not been transferred back to barley.—For infection work pot grown barley which is nearly ready to bloom is placed in cool shady place for a few days. When it is brought into the sun many blossoms open within an hour.—D. Reddick.

1249. BRITTAIN, W. H. Spraying and dusting experiments, 1918. Fruit Growers' Assoc. Nova Scotia Ann. Rept. 55: 102-110. 1919.—The work of four years on apple trees (*Pyrus Malus*) is summarized. Spraying with lime sulphur (1.009 sp. gr.) four times may cause 66 to 75 per cent of the fruit to drop and injure 41 per cent of the foliage of certain varieties such as King, Baldwin, Ben Davis, while on others, like Russet, no injury is apparent. The injury is non-existent in some seasons. Most damage is done by the fourth spray (after the fruit is set). In a comparison of sulphur dust with liquid spray the percentage of apples free from scab (*Venturia inaequalis*) is 96 and 99 per cent respectively, and of apples free from all blemishes, 56 and 73 per cent respectively, the difference in the latter case being due to attacks of sucking insects. The following sprays are recommended: (1) Bordeaux mixture (7:7:100); (2) Soluble sulphur; (3) Same as (1).—Paul A. Murphy.

1250. BRITTLEBANK, C. C. II.—Tomato diseases Jour. Dept. Agric. Victoria 17: 498-500. 1919.—Leaf spot of tomatoes, *Septoria lycopersici* is described. The signs of the disease, its method of spreading and control measures are discussed.—J. J. Skinner.

1251. BRITTLEBANK, C. C. Diseases of plants new to Victoria. Jour. Dept. Agric. Victoria 17: 626-629. Pl. 1-2. 1919.—The anthracnose of lettuce caused by *Marssonina panatonniana* and Botrytis and Sclerotinia diseases of the passion vine are described and control measures given. These were first noted in Victoria in 1916.—J. J. Skinner.

1252. BROCK, W. S. Five years' experimental work in dusting apples. Trans. Indiana Hortic. Soc. 1918: 150-156. 1 fig. 1919.—Development of dusting is traced. Scab and blotch are not controlled. Dusting is more expensive than spraying because of cost of materials. Dusting is advisable for very large orchards, for orchards where diseases are not serious, as a supplementary protection, and for the peach grower. Discussion centers about amount of dust applied per tree and spray gun vs. dust.—Max W. Gardner.

1253. BROCK, W. S. Apple blotch control. Trans. Indiana Hortic. Soc. 1918: 103-111. 1919.—The geographical distribution and economic importance of the disease in Indiana and Illinois and the life history of the causal fungus are reviewed. Spores are exuded between 3 and 4 weeks after the petals fall. Spraying should begin 3 weeks after the petals fall. Lime-sulphur solution or Bordeaux 3:4:50 should be used. In the discussion the questions of dormant spray for blotch, exact time of spray application, effect of fertilizer, effect of pruning, Bordeaux vs. lime-sulphur are considered.—Max W. Gardner.

1254. BROOKS, CHARLES, J. S. COOLEY, AND D. F. FISHER. Nature and control of apple scald. Jour. Agric. Res. 18: 211-240. 1919.—See Bot. Absts. 4, Entry 1617.

1255. BROOKS, F. T. Report on the potato spraying trials, 1918. Jour. Bd. Agric. Great Britain Suppl. 18: 63-68. 1919.—Coöperative trials were carried on in many localities under a wide variety of conditions to obtain more explicit information on the value of spraying with Bordeaux mixture in different parts of the country, as a means of controlling potato blight (*Phytophthora infestans*). Generally the average gain of sound tubers in favor of plots sprayed more than once was about 1.5 tons per acre. Three sprayings gave the best results and two sprayings were superior to one in most cases. No appreciable increase of sound tubers was

obtained in general by spraying with a two per cent mixture instead of a one per cent mixture. In smoky districts the use of larger amounts, 6 and 7 pounds to 40 gallons instead of the usual 5 pounds, of soda tended to reduce the danger of scorching. Dusting did not give as good results as spraying but where water or labor is short it may be used in place of spraying and should be used in preference to no treatment if blight is likely to be severe. No considerable gain in adhesiveness was secured through the use of soft soap, soap powder, or glue.—*M. B. McKay.*

1256. BROOKS, F. T. An account of some field observations on the development of potato blight. *New Phytol.* 18: 187-200. 2 fig. 1919.—Field observations on the first development of *Phytophthora infestans* were undertaken to determine the method of overwintering. While the problem was not solved, the first attacks were found to be strictly limited in extent where infection was not extraneous. Infection spreads centrifugally from the point of appearance.—*I. F. Lewis.*

1257. BRUNER, STEPHEN C. Notas sobre la enfermedad del mosaico de la cana de azucar. [Notes on sugar cane mosaic.] *Revist. Agric. Com. y Trab.* 2: 532-533. 1 fig. 1919.—Several observations showing the infectious nature of the sugar cane mosaic are recorded. Healthy plantings became infected from nearly diseased plantings.—*F. M. Blodgett.*

1258. BRUNER, STEPHEN C. Informe sobre enfermedades del cafeto. [Report on coffee tree diseases.] *Revist. Agric. Com. y Trab.* 2: 533-535. 2 fig. 1919.—The occurrence of two coffee tree diseases are recorded for the first time for Cuba, namely the thread blight caused by the fungus *Pellicularia koleroga* and the iron spot (mancha de hierro) caused by the fungus *Stibella flavida*. These are described and spraying with Bordeaux mixture is recommended as a control. The leaf spot caused by *Cercospora coffeicola* is described and is said to be worse with insufficient shading.—*F. M. Blodgett.*

1259. BURKHOLDER, WALTER H. The dry root-rot of the bean. *Cornell Univ. Agric. Exp. Sta. Mem.* 26: 999-1033. Pl. 56-57; fig. 133-135. 1919.—In addition to the varieties of *Phaseolus vulgaris* the disease occurs on *P. acutifolius*, *P. multiflorus*, *P. aconitifolius*, *P. lunatus*, *P. angularis*, *Vigna sinensis* and *Dolichos biflorus*. *Pisum sativum*, *Trifolium* spp., *Vicia* sp., *Soja max*, *Zea mays*, *Solanum tuberosum*, *Avena sativa*, *Triticum* sp., *Ambrosia*, *Prunella*, *Chenopodium* and *Rumex*, all of which are grown in rotation with beans or occur as weeds are not affected.—The disease occurs in 90 per cent of the fields of western New York. In a wet season losses in experimental plats were about 5 per cent but in a dry season they were 50 per cent.—The roots are affected and slowly dry out; tap roots show reddish discoloration and lesions extend into the stem but rarely appear above ground; foliage turns yellow; pods wither or do not fill. *Fusarium martii* phaseoli n. f. causes the disease. It differs from type only in its parasitism on bean. The fungus winters as mycelium or chlamydospores in the compost heap or field. Observation indicates that the organism may persist many years without the living host.—The effect of external conditions on host and parasite are discussed in some detail.—The following chemicals were used on the soil as disinfectants but none gave any indication of value: lime, acid phosphate, sulfur, formaldehyde, calcium hypochlorite, calcium cyanamid.—Individuals of a late, aberrant type of bean called Flat Marrow have been found which are very resistant to the disease. Hybrids with commercial varieties have shown a very complex segregation. No desirable White Marrow strain has been isolated as yet.—Black root-rot, caused by *Thielavia basicola*, and blotch, caused by *Rhizoctonia* sp., are described very briefly.—*D. Reddick.*

1260. BURKILL, I. H. Lightning and Hevea. *Gardens' Bull. Straits Settlements* 2: 145. 1919.

1261. BURLEIGH, W. B. Formaldehyde for damping off. *Florists' Exchange* 47: 445. 1919.—The writer has used formaldehyde for 4 years with unvarying success. He does not allow soil to dry out after treatment before sowing seed; uses soil while moist but not wet as it gives the seed also a moderate treatment.—*L. A. Minns.*

1262. BUTLER, O. R. Field control of the snapdragon rust.—Florists' Exchange 48: 951. 1919.—Many practical tests lead to the conclusion that finely powdered sulfur or sublimed sulfur is the only known fungicide that affords adequate protection against the snapdragon rust so long as conditions are favorable for its action. The temperature most favorable for the germination of spores of *Puccinia antirrhini* is 50°F. In order that sulfur shall afford full protection, the day temperature must remain for several hours at 70°F. or above. It is only at this higher temperature and in the immediate neighborhood of the sulfur particles that protection is afforded. If all infected plants in a block are not treated, the spores produced on a non-sulfured plant are not affected by the presence of sulfur on neighboring plants, and if blown onto sulfured snapdragons under conditions favorable for germination and at a prevailing temperature too low for the sulfur to be active, will cause infection and the sulfuring will appear less beneficial than it really is.—L. A. Minns.

1263. BYARS, L. P. Experiments on the control of the root-knot nematode, *Heterodera radicola* (Greef) Mueller. I. The use of hydrocyanic-acid gas in loam soil in the field. Phytopath. 9: 93-103. 1919.—Results secured in 1916 and 1917 as a result of treating loam soil in Florida in 1916 with hydrocyanic acid for the control of nematodes are presented in tabular form. Carefully isolated small plots were treated at the rate of 600 to 3600 pounds of sodium cyanide per acre in conjunction with 900 to 5400 pounds of ammonium sulphate. The dasheen (*Colocasia esculenta*) was used as a test crop. The higher applications checked the infections and lower amounts reduced the infection the first year. The nematodes were not entirely destroyed at the highest application as shown by infection the following year. The cost of application is considered too high to render the use of this method practical except on a small scale.—J. Johnson.

1264. BYARS, L. P., A. G. JOHNSON, AND R. W. LEUKEL. The wheat nematode, *Tylenchus tritici*, attacking rye, oats, spelt and emmer. Phytopath. 9: 283-284. 1919.—Experiments were conducted to show the host range of the parasite. This is the first report of the parasite on emmer (*Triticum dicoccum*) and the first record in this country of its attacking rye, oats, and spelt (*T. spelta*). No infections were noted on barley.—C. S. Reddy.

1265. CARPENTER, C. W. Preliminary report on root rot in Hawaii (Lahaina cane deterioration, pineapple "wilt," taro rot, rice root rot, banana root rot). Hawaii Agric. Exp. Sta. Press Bull. 54. 9 p. Pl. 1-8. 1919.—Studies indicate that the Lahaina disease (root rot) of sugar cane, pineapple "wilt," taro rot, banana center leaf necrosis (root rot), and a root rot of rice appear to be caused by a parasitic fungus with a definite mycelium and of the *Pythium debaryanum* type. This root rot fungus is tentatively considered as identical with *Pythium debaryanum*. Characteristic symptoms of the disease were developed in sugar cane by inoculation with pure cultures of the fungus under observation.—J. M. Westgate.

1266. CARSNER, EUBANKS. Susceptibility of various plants to curly-top of sugar beet. Phytopath. 9: 413-421. 7 fig. 1919.—*Chenopodium murale* and *Rumex crispus*, being non-susceptible to curly-top, make excellent food plants for rearing non-virulent leaf hoppers (*Eutettix tenella*), while the chickweed (*Stellaria media*), being very susceptible, is the most suitable for rearing virulent hoppers. The disease has been produced on 14 species of plants included in eight different families and has been crossed back from 12 of these to healthy beets. Hoppers retained virulence after being kept on non-susceptible plants 111 days. Diseased plants of the red-stem filaree (*Erodium cicutarium*), which is a common California winter plant and a food plant of the hopper, have been found in or near beet fields in late summer, fall, and early spring. This species probably plays an important rôle in overwintering the virus and in furnishing a source of the same to the brood of hoppers attacking beets in the spring.—J. C. Walker.

1267. CHANDLER, W. H. The effect of cold winter of 1917-18 on the fruit industry. Trans. Indiana Hortic. Soc. 1918: 91-103. 1 pl. 1919.—See Bot. Absts. 4, Entry 908.

1268. COERPER, FLORENCE M. Bacterial blight of soybean. Jour. Agric. Res. 18: 179-193. Plate A (colored) and 12-18, 1 fig. 1919.—Soy bean, *Glycine hispida*, at Madison, Wisconsin, is subject to an undescribed disease. Lesions on leaves are small, angular spots either isolated or confluent. At first they are light-colored and translucent but later become very dark. The affected tissue may become dry and drop out giving the leaves a ragged appearance. Lesions occur also on petiole, stem and pod.—Disease is caused by *Bacterium glycineum* n. sp. which is able to make entrance without wounds. The organism is a medium-sized rod, motile by from 1 to several polar flagella. Its cultural characters are presented in detail. The group number assigned is 222.2223032: optimum growth 24 to 26°, maximum 35°, minimum, under 2°. Infection is secured by spraying water suspensions of the organism upon plants.—D. Reddick.

1269. COTTON, A. D. Potato diseases. Jour. Bd. Agric. Great Britain Suppl. 18: 28-48. Fig. 1-18. 1919.—A brief popular description including control measures is given of all the diseases that affect potatoes in Britain.—M. B. McKay.

1270. COTTON, A. D., AND H. V. TAYLOR. The causes of decay in potato clamps, with special reference to the season 1918. Jour. Bd. Agric. Great Britain Suppl. 18: 48-60. Fig. 19. 1919.—An exceptional amount of rotting potatoes in clamps in Britain occurred in 1918-19 due to the following most frequent and most important causes which are briefly discussed: (1) Blight rot due to *Phytophthora infestans*: wet rots due to bacterial decay of tubers (2) flooded or waterlogged previous to clamping, (3) injured by frost previous to clamping, (4) affected by blackleg bacillus (*B. atrosepticus*), (5) brought about by the heating of the clamp, or (6) as a result of the penetration of the clamp by frost; and (7) a dry rot due to *Fusarium caeruleum*.—Suggested methods of control include the clamping of only sound tubers, care in the construction of the clamp, the provision of ample ventilation, and periodical inspections of the clamp to detect and check any unfavorable developments.—M. B. McKay.

1271. CROCKER, WILLIAM. Wound callus and bacteria tumor. [Rev. of: MAGNUS, WERNER. Wund-Callus und Bakterien-Tumore. Ber. Deutsch. Bot. Ges. 36: 20-29. 1918 (See Bot. Absts. 2, Entry 610).] Bot. Gaz. 67: 516-517. 1919.

1272. DANA, B. F. A preliminary note on foot-rot of cereals in the Northwest. Science 50: 484-485. Nov., 1919.—The disease in question was first observed on wheat growing at Olympia, Washington. The infected plants, showing elliptical lesions at the base of the stem had dead roots at the first node, and were sickly in growth as well as yellow in color. Later reports, especially from Cowlitz County, showed that the same disease was responsible for uneven stands with considerable lodging. The disease has since been reported from several other counties. Microscopic examination of the fungus showed that the mycelium agrees fairly well with *Rhizoctonia Solani* Kuhn., except that the hyphae are only about one half as large. No fruiting stage of the fungus has been connected with the sterile stage on the culms of the cereals. There seems to be a close similarity between the disease as it occurs in Washington, and the foot-rot of cereals caused by *Ophiobolus graminis* Sacc., as described by McAlpine and others.—A. H. Chivers.

1273. DEPARTMENT OF HORTICULTURE, PURDUE UNIVERSITY, EXPERIMENT STATION. Apple spraying and spray materials. Trans. Indiana Hortic. Soc. 1918: 355-363. 1919.—Directions for preparation and application of sprays.

1274. DOIDGE, ETHEL M. Diseases of stone fruit trees. 2. Freckle or scab (*Cladosporium carpophilum* Thum). South African Fruit Grower 6: 271-273. 1 fig. 1919.

1275. DOIDGE, ETHEL M. Diseases of stone fruit trees. 3. Brown rot or fruit mold, *Sclerotinia fructigena* (Pers.) Schroet. South African Fruit Grower 6: 305. 1919.

1276. DOOLITTLE, S. P., AND W. W. GILBERT. Seed transmission of cucurbit mosaic by the wild cucumber. *Phytopath.* 9: 326-327. 1919.—Seed from wild cucumber (*Micrampelis lobata*) affected with mosaic was saved in 1918 and planted in 1919. Thirteen out of 110 plants developed mosaic. Cross inoculations to healthy plants resulted in the production of mosaic.—R. E. Vaughan.

1277. DOWSON, W. J. Annual report of the mycologist for the year ending 31st March 1917. *Dept. Agric., British East Africa Ann. Rept. 1916-1917*: 81-85. 1918.

1278. DUGGAR, B. M., AND ANNE W. DAVIS. See disinfection for pure culture work; the use of hypochlorite. *Ann. Missouri Bot. Gard.* 6: 159-170. 1919.—See Bot. Absts. 4, Entry 1609.

1279. EHRENBURG, P. Zur Frage der Beizung des Winterweizens gegen Steinbrand. [Disinfection of winter wheat seed against bunt.] *Fühl. Landw. Zeitg.* 67: 425-432. 1918.—Smut was so abundant in parts of Brandenburg that flour was ruined.—Experiments for control were performed with "Uspulun" (Chlorphenol compound of mercury) as offered by Friedr. Bauer & Co. 50 grams uspulun in about 8 liters of water sprayed over 100 kilos of seed; seed covered for 7 hours, spread out to dry and seeded through disinfected machine. In one test untreated seed gave 60 per cent smutted heads, treated, 21 per cent; in another, untreated gave 17.8 per cent, treated 3.7 per cent. Results not entirely satisfactory. Possibly seed should be dipped rather than sprinkled. The material would be easier to use if put out in more concentrated form.—D. Reddick.

1280. ESMARCH. Über den Wundverschluss bei geschnittenen Saatkartoffeln. [Wound healing in cut seed potatoes.] *Fühl. Landw. Zeitg.* 67: 253-256. 1918.—See Bot. Absts. 4, Entry 2410.

1281. EWART, A. J. The cause of bitter pit. *Proc. Roy. Soc. Victoria (N. S.)* 30⁴: 15-20. 1917. [Received in 1919.]—McALPINE's bursting cell theory and vascular interruption theory in regard to the causes of bitter pit are discussed and refuted on the ground of data obtained by the author and by Dr. White. The latter worker who advanced the view that bitter pit is a symptom of slow local poisoning, also considers that it is not confined to fruits such as apple and pear, but may occur in leaves and stems and may be produced artificially by the direct application of poisons. The author cites also the occurrence of brown spongy patches of dead tissue, unaccompanied by disease organisms, which are found in potatoes grown in newly cleared acid soils, and also the disease known as "brown fleck" as possible further instances of natural poisoning. A summary of the evidence in favor of the poison theory of the origin of bitter pit is given. It is pointed out that every symptom of bitter pit can be produced by the artificial application of poisons, including the typical occurrence of starch grains in the dead cells. In apples sensitivity was very great. The poisoning may be oligodynamic, i.e., it may occur in the presence of mere traces of poison. More bitter pit has been found in heavily sprayed orchards than in those not thus treated. A close correspondence between resistance to poison and resistance to bitter pit was noted. This holds also in relation to temperature effects. Both bitter pit and poisoning are retarded by low temperature. In discussing the browning of bitter pit tissues it is pointed out that browning is due to the addition of the oxidase, liberated from the dying protoplasm, upon the tannic acid of the cell sap. Different varieties of apples vary in the degree of browning. The differences in the amount of tannic acid present are not sufficient to account for this. Testing with a dilute solution of amidol showed marked differences in the amounts of oxidase present. It was suggested that the oxidase content might serve to some extent to distinguish certain varieties of apples.—Eloise Gerry.

1282. EYRE, J. VARGAS, E. S. SALMON, AND L. K. WORMALD. The ammonium polysulphide wash. *Jour. Bd. Agric. Great Britain* 26: 821-822. 1919.—Directions are given for the preparation of a stable, concentrated solution of ammonium polysulphide containing as much as 21.9 per cent of polysulphide sulphur.—M. B. McKay.

1283. FAULL, J. H. **Manual of tree diseases.** [Rev. of: RANKIN, W. HOWARD. **Manual of tree diseases.** 398 p. 7 fig. Macmillan Co.: New York, 1918.] Bot. Gaz. 67: 369. 1919.—This is the first American book on the diseases of forest trees, and it will be welcome because containing the only available summary of such diseases. A contribution of prime importance is that the book points out the direction that should be followed by subsequent investigations. [See Bot. Absts. 2, Entry 782.]—H. C. Cowles.

1284. FEDERAL HORTICULTURAL BOARD, U. S. DEPT. AGRIC. Ann. Rept. Fed. Hortic. Bd. 1918. 32 p. 1919.—Attempts to eradicate pink boll worm of cotton in eastern Texas apparently have been successful. A new infestation in western Texas has been brought under control. Aeroplanes were used for locating cotton fields in this section which is wooded and sparsely settled.—European corn borer is now thought to have been introduced into the United States in 1910 on Hungarian broom corn.—Potato wart (*Chrysophlyctis endobiotica*) has been located in new areas in Pennsylvania and has been found in West Virginia. Irish Cobbler and Rose 4 varieties of potato were apparently immune. Immune varieties from the British Isles are being brought in for propagating stock.—Flag smut (*Urocystis tritici*) and take-all (*Ophiobolus graminis*) have been found in the United States. Efforts are being made to eradicate the diseases in the limited areas in which they occur by burning straw and stubble, disinfestation of the grain and of the separators, and elimination of the growth of wheat in the infested areas for a period of years.—There are also included in this report: data on country of origin and nature of nursery-stock importations, and on distribution of such stock in the United States; inspection of imported plants and plant products; need for enlargement of port inspection service.—A list of current quarantines and other restrictive orders is given.—D. Reddick.

1285. FENNEL, E. A., AND M. A. FISHER. Adjustment of reaction of culture medium. Jour. Infect. Diseases 25: 444-451. 1919.—See Bot. Absts. 4, Entry 1451.

1286. FLORIN, R. Om äppleträdens skorvsjuka och dess bekämpande. [Apple scab and its control.] Sveriges Pomolog. fören. Arsskr. 1918: 69-76. 9 fig. 1918.

1287. FOEX, ET. Une maladie des Epinards. [A disease of spinach.] Bull. Soc. Path. Vég. France 6: 35-36. 1919.—A disease of spinach (*Spinacia oleracea*) is briefly described. It seems to show close resemblance to the American spinach blight. The work of MCCLINTOCK AND SMITH is referred to.—C. L. Shear.

1288. FOEX, ET. L'oidium brun des Euphorbes. [The brown Oidium of Euphorbia.] Bull. Soc. Path. Vég. France 6: 31-34. 1919.—See Bot. Absts. 4, Entry 1097.

1289. FROMME, F. D., AND G. S. RALSTON. Dusting experiments in peach and apple orchards. Virginia Agric. Exp. Sta. Bull. 223. 16 p. Fig. 1-2. 1919.—The work was conducted during the season of 1919 in four orchards on four varieties of peaches and two varieties of apples. Two dusting mixtures were used on peaches, a 90 sulfur-10 lead arsenate, and a 50 sulfur-40 filler-10 lead arsenate. Both gave satisfactory control of curculio and scab (*Cladosporium carpophilum*) but neither provided a satisfactory control of brown-rot (*Sclerotinia cinerea*) the percentage of brown-rot ranging from 24 to 45 per cent in the dusted plots of the Champion variety to 53 per cent in the check. A Bordeaux dusting mixture and a 90 sulfur-10 filler-10 lead arsenate mixture were used on apples. Both of these proved very unsatisfactory in the control of bitter rot (*Glomerella cingulata*) on the Albemarle Pippin variety, 76 per cent of the fruit being affected in the plot receiving Bordeaux dust, 63 per cent in the 90-10-10 plot, 9 per cent in the plots sprayed with Bordeaux mixture, and 94 per cent in the check. Both dusting mixtures gave satisfactory control of codling moth and proved as efficient as the liquid. Bordeaux dust gave a very satisfactory control of blotch (*Phyllosticta solitaria*) and leaf-spots (*Sphaeropsis malorum*) on the Ben Davis variety, the amount of blotch on the fruit being reduced from practically 100 per cent in the check plot to 4 per cent in the dusted plot.—F. D. Fromme.

1290. GIROLA, CARLOS D. *Maíces argentinos y aclimatados: Variedades de Maíz cultivadas en Argentina.* [Varieties of maize cultivated in Argentina.] 160 p., 35 pl. Buenos Aires, 1919.—See Bot. Absts. 4, Entry 71.

1291. GREENE, LAURENZ. *Spraying a necessity.* Trans. Indiana Hortic. Soc. 1918: 161-173. 1919.—Popular.

1292. GRISDALE, J. H. *Report of the acting Dominion botanist.* Rept. Dominion [Canada] Exp. Farms 1917-18: 38-41. 1918.—Administrative report with mention of the work being done in the Field Laboratories of Plant Pathology.—D. Reddick.

1293. GUBA, E. T., AND P. J. ANDERSON. *Phyllosticta leaf spot and damping off of snapdragons.* Phytopath. 9: 315-325. 1919.—Symptoms of the disease and cultural characteristics of *Phyllosticta Antirrhini* on *Antirrhinum majus* are given. Wounding is not necessary for infection. High air and soil humidities favor a severe attack of the fungus. All types of the disease except the damping off may be controlled by the use of Bordeaux mixture (4:4:50).—H. Johann.

1294. GÜSSOW, HANS THEODOR. *Report of the Dominion botanist.* Rept. Dominion [Canada] Exp. Farms 1916-17: 40-41. 1918.—Official report of the activities of the department including among other things very brief statements about potato diseases and about club root of crucifers.—D. Reddick.

1295. HARTER, L. L. *Sweet potato diseases.* U. S. Dept. Agric. Farmers' Bull. 714. 24 p., 15 fig. 1919.

1296. HARTLEY, CARL, T. C. MERRILL, AND ARTHUR S. RHODES. *Seedling diseases of conifers.* Jour. Agric. Res. 15: 521-558. Pl. B. 1918.—Damping off is the most serious disease of very young seedling conifers. *Corticium vagum*, *Pythium debaryanum* and *Fusarium moniliforme* have proved especially virulent on seedlings of *Pinus* when grown in heated soil. Other organisms which are believed to cause damping off are *Fusarium ventricosum*, *F. solani*, *F. spp.*, *Trichoderma spp.*, *Botrytis cinerea* and *Pestalozzia funerea*. *Corticium vagum* is reported from 12 coniferous hosts. One strain, maintained in artificial culture for 8 years, retained its virulence. Other strains are practically saprophytes. These differences bear little or no relation to the host from which the strain was isolated. *C. vagum* was found to be especially virulent on pines grown in a very sandy soil which was first treated with sulfuric acid and this followed by lime.—Numerous fungi were tested and found to lack parasitic ability.—Heavy inoculation on seedlings grown in sterilized soil does not give reliable indication of what goes on in the seed bed.—*Corticium vagum* and *Pythium debaryanum* often attack germinating seeds and kill them.—Non-parasitic troubles, with which damping off might be confused, are described and illustrated.—D. Reddick.

1297. HASKELL, ROYAL J. *Fusarium wilt of potato in the Hudson River Valley, New York.* Phytopath. 9: 223-260. Pl. 13-15. 1919.—Tubers from infected vines show the usual browning of the vascular system and also a net necrosis which the author terms *Fusarium necrosis*. Isolations of *Fusarium oxysporum* were obtained from the extreme stem end but negative results were reported from the discolored interior tissue. A somewhat similar necrosis was produced experimentally by injections into the rhizomes of growing tubers with toxic solutions such as oxalic acid and a liquid extract of *F. oxysporum*. The author concludes that *Fusarium necrosis* may be explained by the presence of toxins. Temperature studies show high temperatures to be favorable for the parasite and unfavorable for the host. Artificial inoculations of plants growing at 36°C. gave the best results. A distinct correlation was found between the amount of disease in Dutchess County and the factors influencing soil temperatures. Experimental plantings of seed tubers affected with *Fusarium necrosis* show that the disease may be communicated in this way but plants free from wilt are often produced. "The plants arising from such potatoes however are weak and the yield is small." Spindling sprouts are

often produced from such tubers. The soil is found to be the chief source of inoculum and the roots are the principal mode of entrance. The destruction of roots is the primary reason for the early death of affected plants.—R. W. Goss.

1298. HAWKINS, LON A., AND RODNEY B. HARVEY. Physiological study of the parasitism of *Pythium debaryanum* Hesse on the potato tuber. Jour. Agric. Res. 18: 275-297. Pl. 35-37. 1919.—*Pythium debaryanum* destroys the pentosans, starch and sugar of potato in rotting it. It secretes a toxin which kills the cells and an enzyme which breaks down the middle lamellae but affects little or not at all the secondary thickenings. The varieties Bliss Triumph and Green Mountain are very susceptible; White McCormick is highly resistant. Correlated with this it is found that more pressure is required to puncture the tissues of the latter variety than of the former two. The latter variety likewise shows a higher crude fiber content which is thought to be due to more secondary thickening in the cell walls. Mechanical pressure exerted by the hyphae seems to be the most important factor in cell-wall penetration, and resistance to infection is apparently due to resistance of cell walls to mechanical puncture. Osmotic pressure within the mycelium, determined by plasmolysis, is sufficient to develop the pressure necessary to puncture the cell walls in the tubers in all cases but one in which infection occurred; but it was not sufficient (with 3 exceptions) to develop the pressure necessary to puncture the tissues of tubers in cases where no infection occurred.—D. Reddick.

1299. HEINRICHER, E. Über tödende Wirkung des Mistelschleims auf das Zellgewebe von Blättern und Sprossen. [The killing action of the mucilage of mistletoe seeds upon tissues of leaves and shoots.] Sitzunger. K. Akad. Wiss. Wien (Math.-Nat. Kl.) 126: 815-836. Pl. 1-3. 1917.—While attempting to germinate seeds of *Viscum album* upon young shoots of *Impatiens balsamina* with the hope of developing primary sinkers in the host tissue for demonstration purposes, the author found that the tissue under the seeds was killed by the mucilaginous covering of the seed. The same effect was also produced by placing seeds upon the leaves of *Impatiens* and *Pelargonium inquinans*. The mucilaginous covering of the seeds of *Viscum* is composed of an outer cellulose layer and an inner pectose layer. The pectose layer causes the death of the tissues. Other seeds and fruits with mucilaginous coverings were used and it was found that the viscid material about the fruit of *Anthurium scandens* produced a similar effect to that of *Viscum*. The tissue underneath the seeds is killed directly and by killing the veins the tissue supplied by these may also be killed. Germinating seeds of *Viscum* which had the mucilaginous covering removed did not cause death of the tissue. The nature of the effect of this substance depends upon its physical structure and colloidal nature. It is suggested that this colloidal substance may cause osmotic disturbances and water loss from the tissues or by absorption may withdraw water from the tissues and thus cause the injury resulting in their death.—W. C. Muenscher.

1300. HESSELMAN, HENRIK. Om törskatesvampens spridning. [The spread of the fungus, *Peridermium pini*.] Skogen 6: 9-16. Fig. 1-4. 1919.—This disease is ranked among the worst enemies of the pine in Sweden.—G. A. Pearson.

1301. HOERNER, G. R. Biologic forms of *Puccinia coronata* on oats. Phytopath. 9: 309-314. Pl. 19-20, 4 fig. 1919.—On the basis of the action on Green Russian and Ruakura Rust Proof oats, of strains of *Puccinia coronata* collected on *Avena sativa* and *Rhamnus cathartica* in various localities of the United States, four distinct biologic forms of the rust can be distinguished. The suggestion follows that apparent immunity of a variety of the host may really mean the absence in that locality of a biologic form capable of producing infection, making the breeding problem a local one.—G. Wineland.

1302. HÖHNEL, FRANZ V. Fragmente zur Mykologie XIX. Mitteilung Nr. 1001-bis 1030. [Mycological Fragments XIX, 1001-1030.] Sitzungsber. K. Akad. Wiss. Wien (Math.-Nat. Kl.) 126: 283-352. Fig. 1-19. 1917.—See Bot. Absts. 4, Entry 1111.

1303. HÖHNEL, FRANZ V. Fragmente zur Mykologie XX. Mitteilung Nr. 1031-1057. [Mycological fragments XX. 1031-1057.] Sitzungsber. K. Akad. Wiss. Wien (Math.-Nat. Kl.) 126: 353-399. Fig. 1. 1917.—See Bot. Absts. 4, Entry 1112.

1304. HUNT, CHAS. M. Citrus scab: cause and cure. Florida Grower 20: 8. Nov. 8, 1919.—Brief description of the disease with recommendations for control by spraying is given.—H. R. Fulton.

1305. JACKSON, V. W. Rusts and smuts of grain crops. Manitoba Farmers' Library Ext. Bull. 44. 35 p. 25 fig. Nov., 1919.—In a popular bulletin discussing grain diseases, especially Black Stem Rust (*Puccinia graminis*) and cereal smuts, the writer records the numbers of *Berberis vulgaris* found to date in Manitoba and states that none occur wild. Germination of urediniospores of *P. graminis* from *Hordeum jubatum* was obtained weekly from October 15 to March 15—"after which time it is difficult to find spores or to get viable ones." The writer concludes that urediniospores continue on wild barley until the next wheat crop. A diagram showing dates of appearance of black stem rust in various parts of Manitoba is given for the year 1916.—Data on seed injury by formaldehyde and copper sulphate are given.—G. H. Coons.

1306. JEHLE, R. A., J. W. GOODMAN, AND J. W. LINDLEY. Control of late blight of tomatoes (*Phytophthora infestans*) in the Blue Ridge Mountains. Bull. North Carolina Dept. Agric. 40¹¹: 3-16. 7 fig. 1919.—This paper is a report of coöperative experiments conducted in western North Carolina on the control of late blight of tomatoes. This disease is very destructive in sections whose altitude ranges from 3500 to 4500 feet, but was very successfully controlled by spraying with 5-5-50 Bordeaux mixture. At lower altitudes, where *Septoria leaf spot* (*S. lycopersici*) was present, the use of resin-fish-oil soap Bordeaux gave better control than did Bordeaux alone.—F. A. Wolf.

1307. JOHNSTON, J. R. Diseases of sugar-cane in tropical and subtropical America, especially the West Indies. West Indian Bull. 16: 275-308. Pl. 1-7. 1918.—Descriptions and illustrations of common fungus diseases of sugar cane in America. A bibliography is appended.—C. V. Piper.

1308. JONES, L. R., AND H. H. MCKINNEY. The influence of soil temperature on potato scab. Phytopath. 9: 301-302. 1919.—High soil temperatures are shown to be favorable to the development of potato scab due to the parasite *Actinomyces scabies*. Experimental results harmonize with observations in Europe and the United States.—R. E. Vaughan.

1309. KING, A. M. Notes on the genus *Balansia*. South African Jour. Sci. 15: 670-673. Pl. 25, fig. 1-4. 1919.—See Bot. Absts. 4, Entry 1116.

1310. LAGERBERG, IVAR. Vergleichende Untersuchungen über die Widerstandsfähigkeit der Sporen und der vegetativen Formen einiger sporenbildender Bakterien gegenüber ultraviolett Licht. IV. Mitteilung über die Wirkung der ultravioletten Strahlen. [Comparative studies of the resistance of spores and vegetative forms of spore-forming bacteria to ultra-violet light. IV. On the action of ultra-violet rays.] Zeitschr. Immunitätsforsch. u. Exp. Therapie 28: 186-197. 1919.—See Bot. Absts. 4, Entry 1598.

1311. LAMKEY, E. M. R. A consideration of yellows. Proc. Amer. Carnation Soc. 26: 25-35. 1917.—"Yellows," which appears as a mottled chlorosis of the leaf, is said to be a physiological trouble. A study of the internal structure and physiological processes of diseased plants shows the stomata to be closed, a reduction in quality or quantity of diastase resulting in starch accumulation, and an excessive production of oxidase which interferes with certain physiological functions. A temperature or other environmental relation is suggested by the fact that a diseased plant seems to recover, at least for a time, in the field. Badly yellowed cuttings give yellowed plants, while supposedly healthy cuttings give a few diseased plants. The disease appears to be of an infectious, but not contagious, nature.—L. M. Massey.

1312. LEACH, JULIAN G. The parasitism of *Puccinia graminis tritici* Ericks. and Henn. and *Puccinia graminis tritici-compacti* Stak. and Piem. *Phytopath.* 9: 58-88. *Pl.* 4-6. 1919.—Extensive experiments with these strains on seventy-two hosts indicate a narrower host range for *tritici-compacti*. The explanation seems to be that hard spring wheats are generally resistant while soft winter wheats are quite susceptible. Hard winter wheats show a varying resistance to *tritici-compacti*; but none of these wheats is resistant to *tritici*. A number of wheats are listed which show a distinct difference in behavior to the two rusts and may be classed as differential hosts. The experiments also show *tritici-compacti* to be a distinct and constant biologic form not changed by the use of bridging hosts, and that such biologic forms have specific food requirements, conforming to the molecular configuration of the protoplasm; and resistance can be explained on this basis.—*E. M. Gilbert.*

1313. LEHENBAUER, P. A. The control of carnation stem rot. *Florists' Exchange* 49: 253, 316, 318. 1920.—In the greenhouses of Illinois, the stem rot produces an average annual loss of 2.3 per cent of the carnation (*Dianthus caryophyllus*) crop. In the field the disease is still more destructive. The causal organism (*Rhizoctonia*) is widely disseminated as a soil fungus. Under field conditions no control is known. Treatment of greenhouse soils with sulphuric acid, lime, Bordeaux mixture, copper sulphate, and formalin has been ineffective. Soil sterilization has not produced satisfactory control due to the frequency of introduction of the fungus from outside sources, particularly in the soil carried on the roots of plants. Since a relatively high temperature is necessary for infection, and since wet soil seems to favor the disease, it is believed that the lowering of the temperature of the greenhouse and the limiting of the water supply will prove to be the most effective control measures.—*C. W. Bennett.*

1314. LEONE, G. Ancora del marciume radicale degli agrumi in Tripolitania. [Further remarks on the root rot of orange in Tripoli.] *Agric. Colon. Firenze* 13: 354-355. 1919.—An unidentified nematode resembling *Tylenchus semipenetrans* has been found in roots of orange trees suffering from root rot. The presence of the disease in a young orchard planted on loose, deep soil and receiving only a small water supply tends to invalidate the author's previous theory that the disease is caused by excessive irrigation.—*E. K. Cash.*

1315. LEVINE, MICHAEL. Studies on plant cancer.—I. The mechanism of the formation of the leafy crown gall. *Bull. Torrey Bot. Club* 46: 447-452. 2 pl. 1919.—Testing the hypothesis of E. F. SMITH that inoculation of *Bacterium tumefaciens* into regions of totipotent cells gives rise to leafy shoots which were comparable to a typical teratoid embryomata, the author inoculated *Bryophyllum calycinum* with *B. tumefaciens*, (1) into the leaf notches which normally produce leafy shoots readily, (2) into the leaf near the notches, (3) into the mid-ribs of the leaf, (4) into the growing regions of the stems of young plants.—In all cases it was found that *B. tumefaciens* does not cause the formation of leafy shoots but rather inhibits and retards their normal development and that the pathological condition which does develop is the ordinary crown gall.—*G. H. Coons.*

1316. MACKIE, W. W. Seed treatment for the prevention of cereal smuts. *California Agric. Exp. Sta. Circ.* 214. 8 p. 1919. The details of the methods of seed treatment with copper sulphate and with formaldehyde solutions are given, with a brief discussion of their relative merits under different conditions.—*H. S. Fawcett.*

1317. MARSHALL, ROY E., AND F. D. FROMME. Red cedar trees and cedar rust: a report of a cedar rust survey of Augusta county, Virginia. *Virginia Polytechnic Inst. Ext. Bull.* 39. 8 p. 1 text fig. 1920.—The report contains details of a survey of apple orchards planned to determine the relation between severity of cedar rust infection and relative numbers of red cedars within a mile radius, all data on infection being based on the York Imperial variety. Field data are drawn from 113 orchards and harvest records from 44 orchards. The severity of infection was found to be proportional to the numbers of cedars. For purposes of comparison the orchards are grouped in four classes very few cedars, few cedars, many

cedars, and very many cedars. The average yields, grades, and gross returns in each class are shown. In comparison with the group having very few cedars, the losses in the "very-many-cedars" group amount to a reduction of about 80 per cent in yield, 66 per cent in grade and about 90 per cent in value. The losses in the other two classes were intermediate and comparable. The loss in all classes having more than very few cedars is estimated at \$7.80 per tree, and is thought to have exceeded one-half million dollars for the county as a whole.—*F. D. Fromme.*

1318. MAYER, KARL. *Die Rotfäule.* [The red-rot.] *Forstwiss. Centralbl.* 41: 121-127, 185-195. 1919.—See Bot. Absts. 4, Entry 451.

1319. McALPINE, D. *Immunity and inheritance in plants.* Australian Advisory Council Sci. and Indust. Bull. 7: 78-86. 1918.—Address delivered before a conference of agricultural scientists.

1320. McKINNEY, H. H. *Nomenclature of the potato scab organism.* *Phytopath.* 9: 327-329. 1919.—See Bot. Absts. 4, Entry 1128.

1321. McRAE, W. A disease of the para rubber tree, caused by *Phytophthora Meadii*, McR. *Agric. Jour. India* 14: 566-577. *Pl. 1.* 1919.—The disease caused by the fungus *Phytophthora meadii* was first noticed in 1909-10. The symptoms are an abnormal leaf fall, following the preliminary reddening or yellowing of the leaves. The green leaves first show dull grey spots of irregular outline with minute drops of coagulated latex towards the interior. Early in the monsoon season ashy-gray spots appear on the fruit of infected trees and gradually cover the whole fruit. After falling of fruit the laterals die back. Usually a bark rot follows. The fungus, *Phytophthora meadii*, is found in all tissues of the affected parts. The hyphae ramify chiefly between the cells and produce sexual cells inside the tissue of the fruits. The sporangia are minute pear-shaped sacks containing usually from 14 to 22 spores. The fungus spreads rapidly in the monsoon season. The preventive measures are cutting away of infected wood and removal of diseased fruit, or destruction of flowers to prevent the formation of fruit.—*J. J. Skinner.*

1322. MELCHERS, L. E. A method of steam sterilization of soil for controlling nematodes. *Phytopath.* 9: 294-296. 1919.—A method of sterilizing soil in greenhouses is described, by means of introducing the steam underneath a wooden skeleton platform constructed of timbers two inches thick by four inches wide, upon which the soil is piled. By proper arrangement the soil need be shoveled only once, the platform being pulled out and placed in the pit resulting from the removal of the preceding batch of soil. The method is recommended where only low pressure steam is available or where the construction of the greenhouse is such as to render other methods difficult to use.—*J. Johnson.*

1323. MELHUS, I. E., AND L. L. RHODES. A quick method of eliminating seed-borne organisms of grain. *Science* 50: 21. July, 1919.—Holding grain in formaldehyde solution at 50°C. as for potato scab is ineffective or destructive to the viability of the seed. In order to overcome these difficulties the grain was suspended just above a formaldehyde solution (1 part in 240 parts water) and the temperature was raised to 98° to 99°C. The time of exposure was shortened to 20 seconds. Under these conditions fungi in or on the seed are killed, and in a majority of cases the bacteria are eliminated. The germinating capacity was not injured. It is believed that the method can be made practicable for the control of scab and other seed-borne diseases of grain.—*A. H. Chivers.*

1324. MURRILL, W. A. A polypore parasitic on twigs of *Asimina*. *Mycologia* 11: 319. 1919.—See Bot. Absts. 4, Entry 1136.

1325. MURRILL, W. A. A field meeting of pathologists. *Mycologia* 11: 308-312. *Pl. 15.* 1919.—A field meeting of pathologists, botanists and farm bureau agents lasting several days was held last August at New Haven, Storrs and elsewhere for the discussion of prob-

lems confronting Connecticut farmers. The evenings were devoted to brief papers and discussions and the mornings and afternoons to visits to various farms. Among the subjects discussed was "Peach Yellows," presented by G. P. CLINTON, who expressed the belief that it is probably an enzymotic disease which can be transmitted by grafting.—H. R. Rosen.

1326. MURRILL, W. A. A meeting of pathologists on Long Island. *Mycologia* 11: 320-321. 1919.—A brief note telling of a meeting of plant pathologists to study potato diseases.—H. R. Rosen.

1327. NOWELL, W. Red ring disease of coconuts. *Agric. News* [Barbados] 18: 398. 1919.—This is a report read in Trinidad giving further notes on the nature of this disease. The author brings out the additional fact that the existence of the disease in the roots is only secondary, and the center of infestation is the red zone in the stem which is the feeding ground of the nematodes. While much detail work remains to be done, it seems probable that the worms are introduced with the seed nuts. Infestation may also take place among the leaves without previous injury, quite possibly from dry infected material blowing about or from worms gaining access to the leaf bases of young trees from the soil.—J. S. Dash.

1328. NOWELL, W. The cacao canker fungus as a cause of coconut bud rot. *Agric. News* [Barbados] 18: 414. 1919.—Coconut bud rot in British Guiana and Trinidad may be induced by mechanical, chemical, or parasitic interferences with life processes of the palm. In this connection REINKING's work in assigning to *Phytophthora faberi* causal relation to the bud rot of coconuts found in the Philippine Islands is compared with JOHNSTON's observations with *Bacillus coli* and ASHBY's observations on the relation of *Phytophthora palmivora* to bud rot.—J. S. Dash.

1329. O'BYRNE, F. M. Spraying in a nursery. *Florida Grower* 20: 8. Nov. 8, 1919.—Discussion of the equipment and spray materials useful in citrus nurseries is presented. The insecticidal and fungicidal efficiency of spraying is demonstrated by experimental data.—H. R. Fulton.

1330. OSKAMP, JOSEPH. Some newer phases of disease and insect control. *Trans. Indiana Hortic. Soc.* 1918: 33-42. 1919.—The spray gun saves time, but it is questionable if its efficiency is equal to that of the spray rod. Dry lime-sulphur is easier to handle than the liquid and appears to give as good control of apple scab (*Venturia inaequalis*). Calcium arsenate is equal to lead arsenate as an insecticide and if combined with an equal amount of freshly slaked lime will not burn apple foliage. Dusting with sulphur necessitates a higher cost of materials and a lower cost of labor than spraying but does not control scab and blotch (*Phyllosticta solitaria*) so successfully. A dormant spray of concentrated lime-sulphur has been used for blotch control but the results are negative.—Max W. Gardner.

1331. PALM, BJ. Eenige ziekten waargenomen aan de tarwe op Java. [Some diseases observed on wheat in Java.] *Dept. Landbouw, Nijverheid en Handel, Meded. Lab. Plantenziekten Buitenzorg* 34: 1-20. *Pl. I* (colored), fig. 1-12. 1918.—Observations and a popular description are given for the following diseases which were found in experimental plots from seed imported from India, Europe, and other countries: Loose smut (*Ustilago tritici*), Scurf (*Gibberella saubinetii* = *Fusarium rostratum*), *Helminthosporium* diseases (*H. gramineum* and *H. geniculatum*), and the *Nigrospora* disease (*N. panici*). The smut and scurf were not previously reported in Java and are believed to have been recently introduced on imported seed. The *Nigrospora* which has apparently not been observed outside of Java causes but slight damage and is also found on rice and maize.—R. D. Rands.

1332. PARKER, JOHN H. A preliminary study of the inheritance of rust resistance in oats. *Jour. Amer. Soc. Agron.* 12: 23-38. 1920.—See Bot. Absts. 4, Entry 692.

1333. PATTON, R. T. Timber production and growth curves in the mountain ash (*Eucalyptus regnans*). Proc. Roy. Soc. Victoria (N. S.), 30¹: 1-3. Pl. 1-2, fig. 1-4. 1917. [Received 1919.]—See Bot. Absts. 4, Entry 456.

1334. PETHYBRIDGE, G. H. Notes on some saprophytic species of fungi, associated with diseased potato plants and tubers. Trans. British Mycol. Soc. 6: 104-120. Pl. 3, 4. 1919.—See Bot. Absts. 4, Entry 1152.

1335. PETHYBRIDGE, G. H., AND H. A. LAFFERTY. A disease of tomato and other plants caused by a new species of *Phytophthora*. Sci. Proc. Roy. Dublin Soc. 15: 487-503. 3 pl. 1919.—A disease causing a rot of the root system and lower portion of the stem of young tomato plants is described and named "Tomato-foot Rot." A species of *Phytophthora*, isolated from the diseased tissues, was proved to be the cause of the disease. The fungus, grown in pure cultures, was found not to be identical with any of the previously described members of the genus *Phytophthora*. It was given the name *P. cryptogea*. *Petunia* is reported as a natural host for this parasite and *Aster* and *Cheiranthus* are also suspected. Artificial inoculations show the fungus also to be pathogenic to the potato, to *Gilia tricolor* and *Fagus sylvatica* but not to *Senecio vulgaris*, *Helianthus annuus* or *Nicotiana affinis*. The disease was found to be contracted from the soil. It can be prevented by raising tomato plants in soil thoroughly sterilized by heat.—A. E. Waller.

1336. PETHYBRIDGE, GEORGE H., AND H. A. LAFFERTY. A disease of flax seedlings caused by a species of *Colletotrichum* and transmitted by infected seed. Sci. Proc. Roy. Dublin Soc. 15: 359-384. 2 pl. 1918.—A fungus causing a "damping off" disease of flax seedlings (*Linum usitatissimum*) is described as a new species under the name *Colletotrichum linicolum*. Flax seed from Russia, Holland, Canada, the United States and Japan has been found to give rise to diseased seedlings and it is believed that the disease is widespread over the globe.—A. E. Waller.

1337. PUTTERILL, VICTOR ARMSBY. Notes on the morphology and life history of *Uromyces Aloes* Cke. South African Jour. Sci. 15: 656-662. Pl. 22-23, fig. 1-6. 1919.—See Bot. Absts. 4, Entry 1153.

1338. RAMSEY, GLEN B. Studies on the viability of the potato blackleg organism. Phytopath. 9: 285-288. 1919.—The author concludes that the blackleg organism (*Bacillus atrosepticus*) does not live in tubers that may overwinter in the soil and that there is little chance that uninjured plants will contract the disease even though the causal organism is washed about the stem and root system.—H. H. McKinney.

1339. RAVN, F. KOLPIN, J. LIND, C. FERDINANDSEN, AND SOFIE ROSTRUP. Versigt over Havebrugzstanternes Sygdomme i 1916 og 1917. [Survey of diseases of horticultural plants during 1916 and 1917.] Tidsskr. Landbrug. Planteavl 26: 298-334. 1919.—Discusses the plant disease situation in Denmark during 1916 and 1917. Diseases due to insects, bacteria and fungi are considered.—Albert A. Hansen.

1340. RÉGNIER, ROBERT. Sur le chancre bactérien du peuplier (*Micrococcus Populi*). [Bacterial canker of poplar.] Compt. Rend. Acad. Sci. Paris 169: 85-88. July 15, 1919.—Observations commenced in 1913 are reported upon a canker of Carolina poplar which is common in the valley of the Oise, France, and which is attributed from the work of Delacroix to a micrococcus. Without advancing further evidence in regard to causation, the writer, from observations in nature, records stages in canker formation and the possibility of insect transference. The severity of the disease makes this disease of parallel importance to that caused by *Dothiciza populea*. Control measures are suggested.—G. H. Coons.

1341. ROBERTS, R. H. "Crinkle" on Northwestern Greening. Phytopath. 9: 261-263. Pl. 16-17. 1919.—"Crinkle" on Northwestern Greening in 1918 is reported as being a trouble unusual in Wisconsin orchards. The injury is described briefly in relation to its possible

cause. It is stated that there is "a very definite area of susceptibility surrounding the calyx end of the fruit," and that anatomical studies of this area showed it to be relatively inadequately provided with vascular tissue.—*G. W. Keitt*.

1342. ROSE, D. H. Infection as related to humidity and temperature. [Rev. of LAURITZEN, J. I. The relation of temperature and humidity to infection by certain fungi. *Phytopath.* 9: 1-35. 1919. (See Bot. Absts. 3, Entry 2679.)] *Bot. Gaz.* 68: 66-67. 1919.

1343. ROSEN, H. R. Ergot on *Paspalum*. *Mycologia* 12: 40-41. 1920.

1344. ROSENFELD, A. H. Kavangire: Porto Rico's mosaic disease-resisting cane. *Internat. Sugar Jour.* 22: 26-33. 1920.

1345. RUTGERS, A. A. L. Bliksemschade bij Hevea. [Effect of lightning on Hevea.] *Arch. Rubbercult. Nederlandsch-Indie* 3: 163-171. 1919.—Four types of lightning injury are discussed. Single trees or groups of trees are killed; or a few trees in a group may be killed, the others showing injury; or strips of bark are killed, in some cases in a spiral around the tree. Vertical lightning scars are sometimes found on the stem, which after healing show characteristic scars that cannot be mistaken. Weeping trees that show a number of small lightning scars high up in the stem are the result of lightning. Finally, the scaling off of the outer bark ("scurf") is probably caused by lightning.—*W. E. Cake*.

1346. RUTGERS, A. A. L. Voorschriften voor de bestrijding van bastziekten bij Hevea uitgegeven door het Algemeen Proefstation der Avros, October 1917. [Instructions for the combating of bark diseases in Hevea.] *Arch. Rubbercult. Nederlandsch-Indie* 2: 55-57. 1918.—Abstract in Dutch and English of a circular on the treatment of stripe canker (black thread disease), patch canker, brown bast disease, and burrs, issued by the General Experimental Station of the association of rubber planters of the East Coast of Sumatra.—*H. H. Bartlett*.

1347. SANDERS, G. E. Apple spraying in 1919 (sic). *Fruit Growers' Assoc. Nova Scotia Ann Rept.* 55: 110-118. 1919.—The dropping of the fruit and burning of the foliage of apple (*Pyrus Malus*) when lime sulphur sprays (particularly the fourth spray) are used is said to have been greater in years 1914, 1915, 1916, and 1917, in which the weather was cold and dull, than in the preceding four years, which were warmer. The following sprays are recommended: (1) Bordeaux mixture (3:10:40); (2) Bordeaux mixture (2:10:40); (3) Soluble sulphur (1:40); (4) Bordeaux mixture (2:10:40). It is stated that at least three parts of lime must be used to one part of copper sulphate.—*Paul A. Murphy*.

1348. SCHANDER, R. Beobachtungen und Versuche über Kartoffeln und Kartoffelkrankheiten im Sommer 1917. [Observations and investigations of potatoes and potato diseases in 1917.] *Fühling's Landw. Zeitg.* 67: 204-226. 1 fig. 1918.—See Bot. Absts. 3, Entry 2751; 4, Entry 1913.

1349. SCHMITZ, HENRY. Studies in the physiology of the fungi VI. The relation of bacteria to cellulose fermentation induced by fungi, with special reference to the decay of wood. *Ann. Missouri Bot. Gard.* 6: 93-136. 1919.—See Bot. Absts. 4, Entry 1518.

1350. SCOFIELD, C. S. Cotton rootrot spots. *Jour. Agric. Res.* 18: 305-310. 7 fig. 1919.—Rootrot of cotton (*Phymatotrichum omnivorum*) occurs in well defined areas in cotton fields. When land is cropped continuously to cotton it is found that "the disease does not continue to reappear in successive seasons in the same spots."—Records taken from field plots show that since 1912 there has been a marked increase in the number of plants dying from root rot but the losses from this source were noticeably less in 1917 and 1918 than in 1916.—*D. Reddick*.

1351. SHAPOVALOV, M. Is the common potato scab controllable by mere rotation of crops. *Phytopath.* 9: 422-424. 1 fig. 1919.—From experiments involving the growth of *Actinomyces scabies* upon filter paper for two years, the author concludes that endeavors to eradicate the scab fungus from the soil by rotation methods are likely to be unsuccessful.—*H. H. McKinney*.

1352. SMITH, ANNIE LORRAIN. *Hyphomycetes and the rotting of timber.* Trans. British Mycol. Soc. 6: 54-55. 1918.—See Bot. Absts. 3, Entry 2763; 4, Entry 1162.

1353. SMITH, ANNIE LORRAIN. *Presidential address. The relation of fungi to other organisms.* Trans. British Mycol. Soc. 6: 17-31. 1918.—See Bot. Absts. 4, Entry 1160.

1354. SMITH, ERWIN F., AND LUCIA McCULLOCH. *Bacterium solanacearum* in beans. Science 50: 238. Sept., 1919.—In June, 1919, badly diseased bush beans were received from Lynn Haven, Florida. The leaves were wilted and more or less brown, the petioles were brown and wilted to their base. The roots also were brown and the epidermis was decayed in places. Cross sections showed 50 to 100 per cent of the vessels to be full of bacteria, and no fungi were visible. The supposition was that the disease must be due to the bacteria and that they must have entered through the root system. Agar plates gave pure cultures of a white bacterial organism having all the characteristics of *Bacterium solanacearum*. A number of different legumes were inoculated. Of beans; Wax bush, Valentine, Refugee, Lima (Fordhook variety), Pinto and Great Northern. Of peas; Telephone, Little Marvel and Mammoth Luscious Sugar. The organism has been reisolated from both beans and peas (tested on tobacco and beans) and proved to have the same characters and infectiousness as the original culture. Tobacco and tomato plants used for control showed typical *Bacterium solanacearum* infections. Fortunately beans appear to be very susceptible only in early stages of growth.—A. H. Chivers.

1355. SMITH, ERWIN F., L. R. JONES, AND C. S. REDDY. *The black chaff of wheat.* Science 50: 48. 1919.—See Bot. Absts. 4, Entry 1166.

1356. SMITH, RALPH H. *A preliminary note concerning a serious nematode disease of red clover in the northwestern states.* Jour. Econ. Entomol. 12: 460-462. 1919.—A preliminary account of the finding, in May, 1918, infestation of red clover in Idaho by the stem and bulb nematode, *Tylenchus dipsaci*. Information from the farmers indicates that the trouble has been in southern Idaho for several years and that it is rapidly increasing in destructiveness.—The infested parts of the plant near the ground become enlarged, spongy, and finally turn brown and rot off. The worms also occur higher up in the stems, and in the leaves and branches where they cause distortions and enlargements. The effects upon the plants are most pronounced in autumn and early winter. During the summer, the foliage of affected plants usually has an unhealthy, striped, yellow appearance and the plants as a whole are more or less stunted.—A. B. Massey.

1357. SNELL, JOHN. *Ormskirk potato trials.* Jour. Bd. Agric. Great Britain Suppl. 18: 68-102. Fig. 20-33. 1919.—The testing of varieties of potatoes for immunity to wart disease (*Synchytrium endobioticum*) was continued at Ormskirk during 1918. To date 363 varieties have been tested of which 105 have proved immune, 243 have proved susceptible, and 15 have not been finally classified, being listed for the present as of doubtful immunity. A complete alphabetical list of these three classes of varieties is included in the report.—At Ormskirk, in the past, experiments have been carried out with lime, sulphur, soot, formalin, corrosive sublimate, etc. to kill the spores of the fungus in the soil but none of the substances was successful. This year sterilization of the soil with steam under high pressure for 1½ hours was tested but without success, as every tuber grown from a susceptible variety planted in such soil was badly warted. Tubers grown under similar conditions from the same seed lot but in unsterilized soil presumed to be free from wart disease were all free of any visible trace of the disease. Thus the planting of immune varieties still remains the only known method of combatting what is, perhaps, the most serious disease that has ever attacked potatoes in Britain.—M. B. McKay.

1358. SNELL, JOHN. *Potatoes: local immune variety trials.* Jour. Bd. Agric. Great Britain Suppl. 18: 103-114. 1919.—A series of trials in 1918 to test the suitability of wart-immune varieties to local conditions in those parts of England and Wales where the wart

disease (*Synchytrium endobioticum*) has become a serious menace to the potato crop. It is evident that amongst the varieties immune to wart, of which Lochar, Ally, Great Scot Kerr's Pink, and Majestic were the best yielding varieties in these tests, "there are potatoes that will yield very heavy crops, and some of them may be classed amongst the heaviest-cropping varieties in cultivation at the present time."—*M. B. McKay*.

1359. SOMERVILLE, W. Ear cockles in wheat. Jour. Bd. Agric. Great Britain 26: 907-909. 3 fig. 1919.—A report is given of some brief tests made to determine whether the wheat eelworm (*Tylenchus scandens*) can be successfully controlled by seed treatment. Soaking infested seed in 1 per cent copper sulphate, 0.5 per cent formalin, and 1 per cent formalin for 24 hours in each case did not give perfect control of the eelworm though the germination of the grain was in the case of the formalin treatment greatly reduced. The use of 5 per cent copper sulphate, 0.5 per cent sulphuric acid, and 1 per cent sulphuric acid each for 24 hours gave complete control of the eelworm though, since germination of the grain was reduced 45 per cent or more by the treatments, the use of these solutions is not practical. Wheat infested with eelworms should, therefore, not be used for seed purposes.—*M. B. McKay*.

1360. SPAFFORD, W. J. Trouble affecting cereals in the Penola district. Jour. Dept. Agric. South Australia 22: 527-534. 1919.—A serious trouble causing enormous damage to the cereal crops. The plants are affected after they have apparently made a healthy growth of several inches. The trouble first appears in patches resembling water logged crops. The root system is killed and lesions extend up the crown for about an inch. The leaves begin to dry up, and finally many of the plants die. Investigations to establish the cause of this trouble have been carried on for a period of years, but as yet, the causal organism has not been definitely determined.—*Anthony Berg*.

1361. SPEARE, A. T. The fungus parasite of the periodical cicada. Science 50: 116-117. Aug., 1919.—The fungus, *Massospora cicadina* Peck, has been extremely prevalent about Washington, D. C., during the recent appearance of brood X of *Cicada septendecim*. It appears that conidia and resting spores of this fungus are not formed simultaneously in the same insect, and infected individuals bearing only conidia present a different gross appearance from those insects in which only resting spores are produced. The characteristics produced by infection of both conidia and resting spores are described briefly.—*A. H. Chivers*.

1362. STAHEL, G. Über die Inflorescenzen von *Theobroma cacao* Linn. und *Theobroma bicolor* Humb. und ihre Umformung unter den Einfluss des Krüllotenschimmels (*Marasmius perniciosus* Stakel). [Concerning the inflorescence of *Theobroma cacao* Linn. and *T. bicolor* Humb. and their deformation by *Marasmius perniciosus* Stakel.] Ann. Jard. Bot. Buitenzorg 30: 91-114. 8 pl. 1918.

1363. STEVENS, F. L. Three new fungi from Porto Rico. Mycologia 12: 52-53. 1920.

1364. STEVENS, NEIL E. Keeping quality of strawberries in relation to their temperature when picked. Phytopath. 9: 171-177. 1919.—See Bot. Absts. 4, Entry 947.

1365. STONE, R. E. A new stem-rot and wilt of tomatoes. Phytopath. 9: 296-298. 1919.—This is a greenhouse trouble ascribed to a species of *Botrytis*. The fungus is a wound parasite capable of attacking only under conditions of excessive humidity.—*E. E. Clayton*.

1366. STONE, R. E. Meeting of the Canadian Branch of the American Phytopathological Society. Mycologia 12: 43-45. 1920.—Report of the first annual meeting of the Canadian Branch of the American Phytopathological Society. Various papers presented at the meeting are listed.—*H. R. Rosen*.

1367. SWART, N. L. Jaarverslag 1918. [Report for 1918.] Mededeel. Rubberproefsta. West-Java, Buitenzorg 12: 1-47. 1919.—During the year much attention was given the brown bast disease [cause unknown] of Para rubber. Approximately 20 per cent of the trees

were found attacked in the older plantations. Both of the common methods for treatment were found satisfactory, i.e., (1) the peeling off of all diseased bark and protecting the cambium until renewal begins, and (2) the scraping away of only the discolored tissue. Die-back and an abnormal leaf fall attributed to *Phytophthora* during the rainy season were found severe on many plantations.—*R. D. Rands*.

1368. SYLVÉN, NILS. Über den Kieferndreher *Melampsora pinitorqua* (Braun) Rostr. [*Melampsora pinitorqua* (Braun) Rostr.] Naturw. Zeitschr. Forst- u. Landw. 16: 118-127. 1918.—*Melampsora pinitorqua* was first known to occur in Sweden in 1874. Examination of several pine twigs infected the previous year showed no living mycelium of the fungus. Nor do old infected spots ever produce new aecia. Infection each spring must come from aspen leaves. The younger the pines, the more destructive is the disease to them. One-year old trees are often killed outright. Older ones lose their leaders, new growth developing. Attacked twigs which remain alive are much bent, often becoming "S"-shaped. In several nurseries a small percentage of the seedlings were affected. Ends of twigs killed by the parasite hang down like frost injured ones. As high as 100 per cent infection occurs under favorable conditions. Various outbreaks are mentioned which have occurred in Sweden, the disease appearing to have become very widespread. Study of these outbreak areas indicate that the factors influencing the spread of the fungus from *Populus* to pines are: openness of location allowing free access of the wind, direction of wind, height of poplar trees, proximity of the two hosts, and exposure of the pines to the wind. The sporidia are distributed only to a limited distance. The author intimates that distribution is largely effected by the urediniospores.—*Perley Spaulding*.

1369. SYLVÉN, NILS. 1917 Års knackesjuka norra Västergötland. [*Melampsora pinitorqua* in V. in 1917.] Medd. Stat. Skogsförsöksanst. 15: 192-204. Pl. 19-22. 1918.—A comparative study of the disease caused by *Melampsora pinitorqua* in 1917 and 1916 in northern Västergötland, Sweden. In 1916 it was very abundant and injurious. In 1917 it had almost disappeared. The author attributes this great difference to abundant precipitation in the spring and early summer of 1916 when the fungus from the old *Populus* leaves was infecting the pines; and to a lack of rain at the same time in 1917. A correspondingly low temperature in 1916 and high one in 1917 also is believed to have affected the fungus. It is significant that the years 1873, 1892, 1898 and 1912, when bad outbreaks of the disease occurred, were also characterized by heavy rainfall in May and June. A moist May starts the disease but a moist first half of June greatly increases it in severity and abundance.—*Perley Spaulding*.

1370. TANAKA, TYÔZABURÔ. New Japanese fungi—notes and translations. VIII. Mycologia 12: 25-32. 1920.

1371. TAUBENHAUS, J. J. Recent studies on *Sclerotium rolfsii* Sacc. Jour. Agric. Res. 18: 127-138. Pl. 3-6, fig. 1. 1919.—*Sclerotium rolfsii* is reported as affecting 32 different host plants. "Southern sclerotium rot" is suggested as a common name for the disease produced by it. The range of the fungus is essentially southern and it is found attacking plants grown in light sandy loam as well as vegetable products in storage. The fungus is a true parasite but considerable air and moisture are required for infection. Incubation period 2 to 6 days. Mycelium is in strands or radial fans. Sclerotia vary in size, depending on the host. No physiological specialization has been noted.—*D. Reddick*.

1372. TURLEY, H. E. New fruit fungi found on the Chicago market. Science 50: 375-376. Oct., 1919.—The new fruit diseases found on the Chicago market are: a new *Botrytis* on apple, *Polyscytalum* on grape fruit and *Fusarium* on grapefruit.—*A. H. Chivers*.

1373. VAN HALL, C. J. J. Voorloopige Mededeeling over de wortelschimmels van de Thee. [Preliminary account of the root diseases of tea.] Dept. Landb. Nijv. en Handel. Meded. Proefstation voor Thee (Buitenzorg) 58: 26-27. 1918.—Seven kinds of root diseases are briefly considered and ascribed to the following fungi: *Rosellinia (bothrina?)*, *Rosellinia (bunodes?)*,

Rosellinia sp., *Ustilina zonata*, *Poria hypolateritia*, *Hymenochaete noxia*, and *Armillaria*?—*R. D. Rands.*

1374. VAN HALL, C. J. J. Ziekten en plagen der cultuur gewassen in Nederlandsch-Indië in 1917. [Diseases and enemies of cultivated plants in Dutch East Indies in 1917.] Dept. Land. Nijv. en Handel, Meded. Lab. Plantenziekten Buitenzorg 33: 1-42. 1918.—Unusually heavy rains of the west monsoon were considered responsible for the severe damage to rice and tea from root diseases and the canker of Para rubber. The *Phytophthora* disease of tobacco was prevalent as was also maize mildew (*Sclerospora javanica*) the latter causing large losses in central and east Java. Detailed notes are given on the distribution and damage caused by the common diseases of the more important crops. A report is appended showing the results of inspections of imported plants and fruits.—*R. D. Rands.*

1375. VAN HARREVELD, PH. Stambibittuinen en zeefvatenziekte. [Sugar cane nurseries and the sieve tube disease.] Arch. Suikerindus. in Nederlandsch-Indië 26: 333-346. Feb., 1918. Also Meded. Proefstation Java-suikerindust. Pasoeroean, Landb. Ser. 1918, No. 4.—This paper considers various points raised in a controversy between J. SIBINGA MULDER, (Indische Mercur September 21, 28 and October 5, 1917), H. M. QUANJER (Indische Mercur October 12, 1917), and the author. In support of the latter's contention that it is impossible to free the crop from the sieve-tube or Sereh disease by producing the material for planting at high elevations, experiments are cited to show that cane propagated at high elevations for ten years still developed the disease when transferred to the flat land of the plantations. Importations of varieties from many foreign countries in every case also became diseased. Among the different bacteria isolated from diseased cane, one, which may be identical with *Bacillus vascularum*, is considered the probable cause.—*R. D. Rands.*

1376. VOGEL, IRVIN H. A rose graft disease. Phytopath. 9: 403-412. Fig. 1-6. 1919.—The occurrence of a serious disease of rose grafts in forcing frames at Council Bluffs, Iowa, in 1916 and 1907 is reported, and the symptoms of the disease are described. *Coniothyrium rosarum*, which was found to be associated with the trouble, was isolated and studied in culture and in its thermal relationships. It is stated that inoculations with this fungus induced the disease on the rose, but gave negative results on the black raspberry, while *C. fockelii* from the black raspberry failed to infect the rose. Wide differences in varietal susceptibility are noted and control measures are recommended.—*G. W. Keitt.*

1377. VON BÜSGEN, M. Omnivorie und Spezialisierung bei parasitischen Pilzen. [Omnivorous and specialized parasitic fungi.] Zeitschr. Forst- u. Jagdw. 1919: 144-153. 1919.—A treatise dealing with the probable causes for specialization and the omnivorous habits of various parasitic fungi. Special discussion is given to the results of inoculation experiments with *Botrytis vulgaris*.—*Hermann Krauch.*

1378. WALKER, J. C. Onion diseases and their control. U. S. Dept. Agric. Farmers' Bull. 1060. 23 p. Fig. 1-12. 1919.

1379. WEIR, JAMES R., AND ERNEST E. HUBERT. A study of the rots of western white pine. U. S. Dept. Agric. Bull. 799. 24 p. 1919.—The fungi causing rot of western white pine (*Pinus monticola*) are mainly *Trametes pini*, *Polyporus schweinitzii* and *Fomes annosus*, the first named being most important. Estimated loss from rot in western white pine area is \$7,201,250. A study of factors relating to the cause, spread and control of this rot is based upon data taken from an analysis of about 1400 trees felled in the white pine area. The factors studied are relative age of tree, site, age of infection, injuries and sporophore production. Percentage of infected trees increases consistently as the age classes increase from 41-60 years to 201-years. This correlation is almost identical for both bottom and slope sites the average per cent infection being 55 and 55.3 and the average per cent rot being 7.8 and 6.1 respectively. Although a slightly higher percentage of infection prevails on slope sites the per cent of rot throughout this study is highest on bottom sites. The underlying cause of

this fact is attributed to the wetter, flatter, more poorly drained conditions of bottom sites. Since the earliest age class of trees infected on bottom sites was found to be 71 to 80 years and that on slope sites 61 to 70 years, it is concluded that the earliest age of infection may be safely placed at 50 years. This age of infection is associated with the formation of heartwood and the appearance of injuries susceptible to infection. The period leading up to the earliest age of infection is defined as the one during which greatest precaution should be used in protection from spore infection. Injuries due to broken tops, branch stubs, frost cracks, fire scars, etc. appeared to increase quite consistently with each increase in age class of trees, thus largely accounting for the corresponding increase in rot infection with age. Site was found not to appreciably affect the vitality of sporophores but to have some influence on the number produced. With the higher percentage of rot infection on bottom sites was associated a larger number of sporophores over that found on slope sites. The maximum of sporophore production occurred in the age class of 121 to 160 years. The 101 to 120 age class would, therefore, from the pathological point of view be the proper age class for felling. Felling before the period of maximum sporophore production would appear to be one of the best means of controlling rot infection. Strict observance of pathological marking rules and the removal of infected slash are also recommended as control measures.—*E. V. Hardenburg.*

1380. WOLF, F. A., AND E. G. MOSS. Diseases of flue cured tobacco. Bull. North Carolina Dept. Agric. 40¹²: 5-45. 24 fig. 1919.—This popular, illustrated account concerns the appearance, cause, hosts and control of some of the diseases affecting the growing crop. Consideration is given to wilt, root knot, root rot, sore shank, mosaic, frenching, wildfire, angular leafspot, common leafspot, frog-eye, and crookneck.—*F. A. Wolf.*

1381. YAMAMOTO, R. On the insecticidal principle of *Chrysanthemum cinerariifolium*. Ber. Ohara Inst. Landw. Forsch. 1: 389-398. 1918.—See Bot. Absts. 4, Entry 2693.

1382. YOUNG, H. C. Seed disinfection for pure culture work. Ann. Missouri Bot. Gard. 6: 147-158. 1919.—See Bot. Absts. 4, Entry 1615.

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

HEBER W. YOUNGKEN, *Editor*

1383. ANONYMOUS. Animal and vegetable rennets. Their properties, their preparation, and their mode of action. [Translated from F. Faideau, in *LaRousse Mensuel* (Paris)]. Sci. Amer. Supplem. 87: 285. 3 fig. 1919.—Plants rich in rennet include the wild artichoke (*Cynaria cardunculus*), yellow cheese-rennet (*Galium verum*), common fig, butterwort (*Pinguicula vulgaris*), papaw (*Carica papaya*), (*Witania coagulans*) of India, paper mulberry (*Broussonetia papyrifera*), darnil, lucerne, lupine, euphorbia, madder, etc.—*Chas. H. Otis.*

1384. ANONYMOUS. Surgical sphagnum in eastern Maine. Sci. Amer. 121: 5. 1919.

1385. ANONYMOUS. The castor bean and its many uses. Sci. Amer. 120: 528, 530. 1919.

1386. ARNOLD, JULSON. Chinese products of interest to nurserymen. Nation. Nurseryman 27: 20-21. 1919.—See Bot. Absts. 4, Entry 895.

1387. HOEPNER, KARL. Beitrag zum Nachweis eines unzulässigen Schalengehaltes in Kakaoerzeugnissen. [Inadmissible shell content in cacao products.] Zeitschr. Untersuch. Nahrungs-u. Genussmittel. 37: 18-31. 1919.—Report of examination for impurities of cacao powder from various sources. A shell content of cacao products is inadmissible according to German official standards if (1) the microscopic examination shows a considerable number of cellular elements of shells, (2) the fat-free and sugar-free dry residue contains an ash-free crude fiber content of more than 6 per cent, (3) the fat-free and sugar-free dry substance con-

tains more than 0.1 per cent Fe_2O_3 and more than 0.5 per cent acid-insoluble ash. The percentage of adulteration may be determined roughly by the formula $(X-6) \times 10$, where X is the crude fiber content of the fat-free dry residue. The samples examined from United States, Scandinavian, Dutch and German sources are reported normal; samples from unknown and unmentioned sources were found impure.—*H. G. Barbour.*

1388. JOACHIMOWITZ, MARIANNE. *Bilsenkrautsamen enthaltender Mohn.* [Poppy containing henbane seeds.] *Zeitschr. Untersuch. Nahrungs-u. Genussmittel* 37: 183-185. 1919.—In Vienna, among eaters of a poppy meal, an epidemic of poisoning recently occurred (characterized by visual disturbances, throat dryness, and difficulty in swallowing), said to be due to henbane seeds which became mixed with the poppies in the process of mowing and threshing in Russia, whence smuggled. The biological test (dilation of cat's pupil) was found the most practical for identification.—*H. G. Barbour.*

1389. NICHOLS, F. M. G. W. *Commercial medicinal plants.* *South African Jour. Indust.* 2: 1081-1084. 1919.

1390. RECORD, S. J. *Lignum-vitae, the vital wood.* *Sci. Amer. Supplem.* 88: 4-5, 15-16. 6 fig. 1919.—See Bot. Absts. 4, Entry 459.

1391. RUPP, G. *Tabak-Ersatzmittel.* [Tobacco substitutes.] *Zeitschr. Untersuch. Nahrungs-u. Genussmittel* 37: 370-377. 1919.—See Bot. Absts. 4, Entry 121.

1392. SMALL, JAMES. *The application of botany in the utilization of medicinal plants.* *Pharm. Jour.* 103: 199-201, 213-215, 248-250, 294-296. 1919.

PHYSIOLOGY

B. M. DUGGAR, *Editor*

GENERAL

1393. BEAUVERIE, J. *Revue d'agronomie.* [Review of agronomy.] *Rev. Gen. Sci. Pures et Appliquées* 30: 370-384, 411-418. 1919.—See Bot. Absts. 4, Entry 26.

1394. BOWER, F. O. *Botany of the living plant.* $x + 580$ p., 447 fig. Macmillan & Co.: London, 1919.—This book represents an expansion of the "Course of Elementary Lectures on Botany" given in Glasgow University for 30 years. The object of the work is stated to be "that of presenting the plant as a living, growing, self-nourishing, self-adapting creature." In developing a sequence of topics the author arranges his material in accordance with the idea that it is better to begin with the better known plants (those of larger size and generally familiar) proceeding to those generally smaller and lesser known. Some physiological facts are distributed throughout, but certain chapters (IV, the leaf; V, the root; VI, the water relation; VII, nutrition, storage, and respiration; and VIII, growth and movement) contain more of physiological significance. No citations of literature are included and no collateral reading is suggested. There is a combined index and glossary of 32 pages.—*B. M. Duggar.*

1395. PÉCHOUTRE, F. *Revue de botanique.* [Review of botany.] *Rév. Gen. Sci. Pures et Appliquées* 30: 242-250. 1919.—See Bot. Absts. 4, Entry 176.

PROTOPLASM, MOTILITY

1396. FOSTER, NATHAN. *Colloids and living phenomena.* *Sci. Monthly* 9: 465-473. Fig. 1-9. 1919.—Protoplasm consists essentially of water, crystalloids, and colloids. It is immaterial in this discussion of the rôle played by colloids in living reactions whether one's conception of life is vitalistic or mechanistic.—Examples of crystalloids are sugar, salts, fatty acids,

mino-acids, glycerine; of colloids, gelatin, albumens, glue, gums. These are really states, and the power to change from the one to the other seems the very essence of cell life.—Colloids are generally divided into different phases depending on their more liquid or jelly-like condition. Hydrosols are pseudo-solutions, hydrogels are either emulsions or coagulated, or precipitated.—The particles of colloids do not enter into real solutions, but usually exist as suspensions which can be seen with the ultra-microscope. But they are also known to be in suspension and not in solution from the facts that boiling and freezing points of these fluids are not much changed and no osmotic pressure is developed. A few colloids do show these effects and these are soluble.—The foam structure, granular structure, networks, spindle fibres, chromosomes, and the like originate by the more or less solid condition of the multimolecules and large molecular complexes.—Colloidal gels are reversible and non-reversible, gelatin being an example of the former and egg albumen of the latter.—Colloidal particles behave as a single particle in bearing electrical charges, the acid generally being negative and the alkaline positive. Hardy has made an extensive study of the electrical properties of colloids.—The irritability of the human organism is largely due to the state of the colloids in the nervous system, the gel condition causing irritability.—“Only by understanding the reaction of the three substances entering into living combinations, namely, water, crystalloids, and colloids can we hope to comprehend such living processes as metabolism, growth, irritability, and the like; and in order to understand life or the life process the biologist must give his moments to the study of colloids.—*L. Pace.*

1397. STECKBECK, D. WALTER. **The comparative histology and irritability of sensitive plants.** Contrib. Bot. Lab. Univ. Pennsylvania 4: 185-230. Pl. 58-65. 1919.—The investigator notes that the sensitive plants are most common in tropical countries and that the most widespread irritable response is the nyctitropic, probably induced by rapid changes in temperature, transpiration, and radiation in transition from day to night. Paraheliotropic responses followed with responses to light and mechanical stimuli in sequence. The comparative histology of the sensitive structures is given with emphasis on the various kinds of crystals of calcium oxalate restricted to the endodermis with the membranes surrounding the crystals arranged to form continuous protoplasmic connections throughout the endodermal region as the special conducting lines for the passage of stimuli. It was found that with transition from the less sensitive to the more sensitive species the cells of the pulvini contain, in increasing amount and complexity, aggregation bodies resembling those previously described by Darwin, and others, as associated with irritcontractile centers, and which change under stimulation. All irritcontractile changes seem to be due to changes first in the protoplasmic sac surrounding each aggregation body, next in the aggregation body itself, finally in the amount of liquid these absorb or give off. The complex hairs of the plant act as delicate receptors of the stimuli.—*John W. Harshberger.*

1398. TOLMAN, RICHARD C., AND RUSSELL S. BRACEWELL. **The molecular mechanism of colloidal behavior. II. The swelling of fibrin in alkalis.** Jour. Amer. Chem. Soc. 41: 1503-1510. 1919.—“Tolman and Stearn have studied the swelling of fibrin in acid solutions, and correlated the swelling with the amount of acid absorbed from the solution.” They think fibrin covered with water is a fibrous, spongelike structure with many pores full of water. The addition of the acid is followed by the adsorption of hydrogen ions to form a double layer on the surface of these pockets with an increase in size owing to electrostatic repulsion. The addition of a neutral salt or the further addition of acid is followed by a decrease in swelling because of the neutralization of the original electrostatic repulsion. The addition of a neutral salt leads to further adsorption of acid owing to the fact that the neutralization of the electrostatic forces makes it easier for further hydrogen ions to attach themselves to the walls of the pockets. The effect of strong alkalis is similar to the above.—*J. M. Brannon.*

DIFFUSION, PERMEABILITY

1399. ANONYMOUS. **Honey.** Newest theories concerning the function of the nectary in flowers. Sci. Amer. Supplem. 88: 22-23. 1919.—See Bot. Absts. 4, Entry 977.

1400. BEZSSONOF, N. Über das Wachstum der Aspergillaceen und anderer Pilze auf stark zuckerhaltigen Nährboden. [Development of Aspergillaceae and other fungi on media containing a high percentage of sugar.] Ber. Deutsch. Bot. Ges. 36: 646-648. 1918.—*Aspergillus Oryzae*, which was not known to reproduce sexually, produces perithecia when grown on gelatin containing 42 per cent sugar and incubated at 18°C. *Rhizopus nigricans* growing on a 48.7 per cent sugar solution produces zygotes abundantly. Decrease in temperature apparently favors sexual reproduction, which may be the result of the lower oxidation rate at the reduced temperature.—*Ernst Artschwager*.

1401. CITRON, H. Ueber ein neues Verfahren zur Herstellung von Kollodiumsäckchen. [A method of preparing collodion tubes.] Zeitschr. Immunitätsforsch. 27: 363-364. 1918.—A gelatin capsule of the proper size is coated with collodion on the outside, allowed to dry, the gelatin hydrolyzed by any enzyme preparation or gelatin-liquefying organism and thoroughly washed, after which it is ready for use.—*C. W. Dodge*.

1402. COUPIN, HENRI. Sur le pouvoir absorbant du sommet des racines. [Absorption by the tip of the root.] Compt. Rend. Acad. Sci. Paris 168: 519-522. 1919.—Two seedlings each of pea, Castor bean, bean, and pumpkin, with the plumules scarcely visible and roots of 3 cm. length, were suspended in the same flask in such a way that one of the seedlings did not touch the water in the bottom, while the tip of the root of the other penetrated the water for 2 to 3 mm. The mouth of the flask was plugged with cotton and the cultures placed in the dark at 24°C. At the end of 24 hours the length of root and plumule was recorded and the seedlings so adjusted that only the tips of the roots touched the water. Observations were continued 6 days. In all cases where the tip of the root was immersed in water there was a marked elongation of both plumule and root, and a strong production of lateral roots. Root elongation in the case of pea and bean amounted to 5 to 7 cm., and to 15 cm. in pumpkin. In the seedlings which were merely suspended in the humid air elongation was scarcely perceptible, the plants beginning to dry out at the end of the fourth day. The root is able to absorb water at the very tip in quantities sufficient to permit the maximum development of the seedlings.—*F. B. Wann*.

1403. CROCKER, WILLIAM. Aeration systems of leaves. [Rev. of: NEGER, F. W. Die Wegsamkeit der Laubblätter für Gaze. Flora 11-12: 152-161. 1918 (See Bot. Absts. 2, Entry 619).] Bot. Gaz. 67: 517-518. 1919.

1404. CROCKER, WILLIAM. Permeability. [Rev. of: PAINE, S. G., and L. M. SAUNDERS. On a peculiarity exhibited by the testa of wrinkled peas. Ann. Botany 32: 175. 1918.] Bot. Gaz. 67: 279. 1919.

1405. CROCKER, WILLIAM. Turgor and osmotic pressure. [Rev. of: THODAY, D. On turgescence and the absorption of water by the cells of plants. New Phytol. 17: 108-113. 1918. (See Bot. Absts. 1, Entry 686).] Bot. Gaz. 68: 72. 1919.—“This article ought to do much to clear up the confusion in this field.”

1406. FLOOD, MARGARET G. Exudation of water by *Colocasia antiquorum*. Notes Bot. School Trinity Coll. 3: 59-65. 2 pl. 1919.—The extreme purity of the water exuded from the leaf tips of *Colocasia antiquorum* appeared to be strong evidence in favor of regarding the water as either raised or exuded by a special gland or as raised osmotically and subsequently purified by glandular action. Observations and experiments indicate, however, that there is no special tissue in the leaf-tip which might be described either as a gland or epithem for the secretion. Neither is there any membrane intervening between the water-channels and the depression in the leaf for filtering the water. It seems that cells lower down must be responsible for the filtration of the water. There seems to be no evidence for the existence of special cells for this function outside of the root.—*G. B. Rigg*.

1407. HAYNES, DOROTHY. Electrical conductivity as a measure of electrolytes of vegetable saps. Biochem. Jour. 13: 111-123. 1919.—A study is made of the influence of non-electro-

lytes on the conductivity of electrolytes in special reference to conductivity measurements of plant juices. The author ascribes the low results obtained in such measurements to the mutual action of non-electrolytes and salts, but does not discuss the nature of the action. A study is also made of the results of Dixon and Atkins on frozen and unfrozen tissues—the author finding there is little evidence for the marked differences which they assume to exist in the proportional composition of the two saps. A formula is suggested by which, in certain cases, conductivity measurements may be reduced to standard conditions.—*A. R. Davis.*

1408. SHULL, C. A. **Permeability.** [Rev. of: FREE, E. E. A colloidal hypothesis of protoplasmic permeability. *Plant World* 21: 141–150. 1918. *Bot. Gaz.* 68: 70. 1919.—This new hypothesis as to the nature of permeability and changes in permeability seems to the reviewer less objectionable than any previously proposed; it should stimulate research, since definite testing seems possible.—*H. C. Cowles.*

1409. URSPRUNG, A. **Über den Einfluss der Erwärmung auf die Wasseraufnahme untergetauchter Sprosse.** [On the influence of rise in temperature on the water absorption by submerged plants.] *Ber. Deutsch. Bot. Ges.* 36: 514–528. 1918.—Experiments carried on with shoots of *Fagus* and *Thuja* show that an increase in the temperature of the water, in which the shoots are immersed, has at first no effect on water absorption, and often causes a movement in the opposite direction. This is followed by a sudden rise in the absorption curve, then a decrease, and finally a cessation of the movement of water. The decrease, observed by immersing the shoots in water, may be due to the expansion of the air in the vessels. The following rise in the absorption curve is probably due to the activity of the living cells. These cells may at first absorb a small amount of the air in the vessels, thereby producing a negative pressure; however, the amount of air absorbed could only be small and would not account for the sudden rise of the absorptive curve. The explanation may well be sought in the increased absorbing power of the living cells, accompanied by a change in the permeability of the plasma membrane when the temperature of the surrounding medium is increased.—*Ernst Artschwager.*

1410. URSPRUNG, A., AND G. BLUM. **Zur Kenntnis der Saugkraft II.** [Contribution to our knowledge of the suction force.] *Ber. Deutsch. Bot. Ges.* 36: 577–599. 1918.—The method for measuring the suction force of cells is previously described (*Ber. Deutsch. Bot. Ges.* 34: 525). The material was left in the solution (0.2 M cane sugar) for a definite time, usually one hour. In order to save time in calculating the results, the threshold concentration was determined for two decimals only. Only mature leaves were examined, all of them coming from a single plant, *Hedera*, which was kept under the same environmental conditions throughout the experiment. The following values (expressed in atmospheres) were obtained: lower epidermis 5.6–8.4, upper epidermis 7–8.7, upper palisade 8.7–16.4, spongy parenchyma 7.3–12.4, bundle sheath 7.3–9.3, collenchyma 7.3–8.1, guard cells 7.15–13.7, parenchyma of petiole 6.7–9.3, upper stem 4.2–7.4, lower stem 2.1–3.3, ray cells 2.1–2.6, root 0.8–3.2.—*Ernst Artschwager.*

1411. URSPRUNG, A., AND G. BLUM. **Besprechung unserer bisherigen Saugkraftmessungen.** [Discussion of earlier results on suction phenomena.] *Ber. Deutsch. Bot. Ges.* 36: 599–618. 1918.—The pressure increases from the vascular tissue toward the epidermis. The highest pressure is found in the upper palisade layer. The epidermis gives lower values. The guard cells have a relatively higher pressure than the adjacent epidermal cells. The parenchymatous bundle sheath has a slightly lower value than the epidermis, which would enable the latter tissue to obtain water that could not be obtained through the palisade cells which always have a higher pressure. It becomes apparent that the palisade tissue and the spongy parenchyma obtain the water directly from the water-conducting elements and draw on the supply in the epidermis only when the water content sinks very low. As a rule, the suction force of a tissue increases with its distance from the roots, and in a given cross section of an organ the pressure increases with an increase in the distance from the water-conducting tissue. The one exception is the epidermis of the leaf lamina and this makes it possible that in times of need the palisade cells can draw on the water reservoir of the epidermis.—*Ernst Artschwager.*

WATER RELATIONS

1412. CLARK, ARABEL W. Seasonal variation in water content and in transpiration of leaves of *Fagus americana*, *Hamamelis virginiana*, and *Quercus alba*. Contrib. Bot. Lab. Univ. Pennsylvania 4: 105-143. 33 fig. 1919.—The object of the research work recorded in this paper was to determine seasonal variations in water content and transpiration of leaves of the beech, witch-hazel, and white oak. Results show that there is no connection between water content and transpiration, temperature and relative humidity, and that from 8 a.m. to 5 p.m., there is practically no variation in water content, but that variations are regular and constant for transpiration. The average water content was greater for *Hamamelis virginiana* than for *Fagus americana* and *Quercus alba*. It was found that water content is highest in the spring, falls during the summer, and rises again in the fall, and that transpiration is greatest in the spring and lowest in the fall.—*John W. Harshberger*.

1413. COULTER, J. M. Water conduction in trees and shrubs. [Rev. of: FARMER, J. BRETLAND. On the quantitative differences in the water-conductivity of the wood in trees and shrubs. Proc. Roy. Soc. 90 B: 218-250. 1918. (See Bot. Absts. 2, Entries 305, 306).] Bot. Gaz. 67: 274-275. 1919.

1414. CROCKER, WILLIAM. Transpiration. [Rev. of: DUGGAR, B. M., AND W. W. BONNS. The effect of Bordeaux mixture on the rate of transpiration. Ann. Missouri Bot. Gard. 5: 153-176. 1918. (See Bot. Absts. 1, Entry 688).] Bot. Gaz. 67: 277-278. 1919.

1415. CROCKER, WILLIAM. Water movements in plants. [Rev. of: RENNER, O. Versuche zur Mechanik der Wasservorsorgung. Ber. Deutsch. Bot. Ges. 36: 172-179. 1918. (See Bot. Absts. 2, Entry 549).] Bot. Gaz. 68: 72. 1919.

1416. HOAGLAND, D. R., AND A. W. CHRISTIE. The effect of several types of irrigation water on the P_H value and freezing point depression of various types of soils. Univ. California Publ. Agric. Sci. 4: 141-157. 1919.—See Bot. Absts. 4, Entry 1654.

MINERAL NUTRIENTS

1417. ANONYMOUS. Salt and the growth of coastland plants. Agric. News [Barbados] 18: 321. 1919.

1418. BACHMANN, E. Wie verhalten sich Holz- und Rindenflechten beim Übergang auf Kalk? [The behavior of wood and tree lichens on a limestone substrate.] Ber. Deutsch. Bot. Ges. 36: 528-539. 1918.—In the metabolism of endo- and epido-lithic lichens acids are secreted which form soluble salts with the limestone. The secretion of the acid is most pronounced on the surface of the gonidia and the tips of the hyphae which penetrate the limestone formation rapidly. The nature of the acid is not known; however, it is very likely that it is carbonic acid which is liberated in the process of respiration of the organism.—*Ernst Artschwager*.

1419. BREAZALE, J. F. Response of citrus seedlings in water cultures to salts and organic extracts. Jour. Agric. Res. 18: 267-274. Pl. 33-34. 1919.—Seedlings of various citrus stocks, including lemon, grapefruit, and several varieties of sweet oranges, showed no characteristic differences in response in water cultures or in resistance to toxic solutions.—Very dilute organic extracts from upland peat (10 parts per million or more) stimulated root growth markedly; but sodium nitrate or potassium chlorid, to which the stimulation might have been attributed, proved not to be stimulants.—Calcium carbonate stimulated root growth and also showed pronounced antagonistic action to toxic solutions of nitrates and ammonium sulphate.—Very dilute peat extract (20 parts per million) and calcium carbonate (solid phase present) both protected seedlings against the toxins of distilled water.—Tolerance of seedlings for alkaline salts is relatively high. The toxic limit for calcium hydrate was 100 to 120 parts per million, for sodium hydrate 250 to 300 parts per million, sodium carbonate 550 to 600 parts per

million. Hydroxyl concentration in toxic calcium hydrate solution is only about one-third that of toxic sodium hydrate.—When soluble organic matter, acid in reaction and of itself stimulating in concentrations up to 1000, is added to sodium carbonate solution of 400 parts per million, in itself not toxic, a highly toxic solution is formed which kills the root tips.—*D. Reddick.*

1420. BURD, JOHN S. Rate of absorption of soil constituents at successive stages of plant growth. *Jour. Agric. Res.* 18: 51-72. *Fig. 1-13.* 1919.—A selected strain of Beldi barley was grown one year in silty clay loam and another year in fine sandy loam, contained in boxes. Precautions were taken that individual plants should have access to equal volumes of soil, that loss of soil constituents in drainage should be avoided, and that plant constituents should not be dissolved and removed by rain. Until the tenth week of growth (phase 1) there was a progressively increasing absorption of nitrogen and potassium, when the absolute amounts of these in the plants were as great as at maturity. From this period until heading (phase 2) substantial losses of potassium and nitrogen, and perhaps also of calcium, occurred. During seed ripening (phase 3) absorption from the soil ceased and there were losses of all constituents determined in the plants. Dry matter at harvest was found to be proportional to the fresh weight at the end of phase 1, at which time the absorption of nitrogen and potassium was proportional to growth. Losses from the plants occurred when the amounts of water soluble soil constituents were at or near their minima. The results are interpreted as showing a movement of chemical elements from the plants to the soil, in response to concentration differences between the plant sap and the soil solution. It is concluded that a high concentration of the soil extract is probably unnecessary after the first phase of growth.—*W. E. Tottigham.*

1421. CROCKER, WILLIAM. Physiological balance in soil and other nutrient solutions. [Rev. of four papers: HIBBARD, R. P. Physiological balance in the soil solution. *Michigan Agric. Exp. Sta. Tech. Bull.* 40. 44 p. 1917. LIVINGSTON, B. E., AND W. E. TOTTINGHAM. A new 3-salt nutrient solution for plant cultures. *Amer. Jour. Bot.* 5: 337-346. 1918. SHIVE, J. W., AND W. H. MARTIN. A comparison of the food requirements of the wheat plant at different stages of its development. *Amer. Jour. Bot.* 5: 186-191. 1918. MCCALL, A. G., AND P. E. RICHARDS. Mineral food requirements of the wheat plant at different stages of its development. *Jour. Amer. Soc. Agron.* 10: 127-134. 1917.] *Bot. Gaz.* 67: 175-177. 1919.

1422. CROCKER, WILLIAM. Knop's solution. [Rev. of: (1) TOOLE, E. H., AND W. E. TOTTINGHAM. The influence of certain added solids upon the composition and efficiency of Knop's nutrient solution. *Amer. Jour. Bot.* 5: 452-461. 1918. (2) TOTTINGHAM, W. E. Sulfur requirement of red clover plant. *Jour. Biol. Chem.* 36: 429-438. 1918.] *Bot. Gaz.* 67: 448. 1919.—The reviewer wonders how much more the water culture method alone can add to our knowledge of soil fertility, and suggests that in the concentrated nutrient solutions now employed, we may be mainly playing the toxic concentration of one salt against the toxic concentration of another, so as to get the least possible injury. [See *Bot. Absts.* 2, Entry 1117.]—*H. C. Cowles.*

1423. GREEN, NEWTON BALDWIN. The effect of ions of NaCl and CaCl_2 upon the electrical conductivity of certain colloidal mixtures. *Plant World* 21: 303-316. 7 *fig.* 1918.—The behavior of sodium and calcium ions during penetration of several colloids as indicated by measurements of electrical conductivity shows that there is no antagonism between them as regards penetrability; however, calcium moves more slowly than sodium because of its greater adsorption by the colloids. Electrical resistance of colloids containing salts in varying concentrations, varies directly with the precipitability of the colloid, which is greatest at the isoelectric point. Balanced solutions are believed to owe their effectiveness to the fact that protoplasm, by equal adsorption of + and - ions from them, is brought to the isoelectric point, at which point the proteins are most highly ionized, the greatest amount of precipitate is formed, and the greatest (normal) permeability results.—*Charles A. Shull.*

1424. HOAGLAND, D. R. Relation of the concentration and reaction of the nutrient medium to the growth and absorption of the plant. *Jour. Agric. Res.* 18: 73-117. *Fig. 1-4.* 1919.—This is an attempt to correlate the results of recent methods of investigation in plant nutrition with the present knowledge of soil solutions. Beldi barley was grown in nutrient solutions and in sand irrigated with nutrient solutions. Special care was taken to avoid deficiency of nutrients. Except where the effects of acidity were to be determined, a neutral solution of nutrient salts was used which varied in composition and total concentration. In some cases, the concentration of the nutrient solution was reduced after the tenth week, in imitation of certain seasonal conditions observed with water extracts of soils.—The results indicated the optimal concentration of the nutrient solution to be not over 0.6, and possibly less than 0.1, atmosphere. With the more concentrated solutions, nitrogen and potassium accumulated in the tops of the plants, while it appeared that insoluble phosphates of calcium and magnesium were deposited in the roots. The critical period of absorption of nutrients appeared to fall between the third and tenth weeks of growth. Excessive, and apparently needless, absorption occurred thereafter from the more concentrated solutions. Reduction of the supply of nutrient salts after the tenth week reduced the final yield of straw, but not of seed. It appeared that electrolytes might be returned to the nutrient solution by the plant under conditions of high concentration of the nutrient solution or of low light intensity. The plant sap was found to have a uniform acidity of P_H 6.1. Acid reaction of the nutrient solution (P_H 5.0-5.5) was favorable, and attended by excessive absorption of PO_4 by the plants. The latter absorb the anion faster than the cation from $NaNO_3$, but the excretion of CO_2 regulates the alkalinity of the nutrient solution. Plants transferred from solutions to water lost Ca and PO_4 . The author urges consideration of variability in plants in interpreting the yields of culture experiments.—A bibliography of 56 titles is appended.—W. E. Tottingham.

1425. PFEIFFER, TH., W. SIMMERMACHER, AND A. RIPPEL (in collaboration with Frl. H. FRISKE and Frl. CH. PFOTENHAUER). Der Gehalt der Haferpflanzen an Stickstoff. Phosphorsäure und kali unter verschiedenen Bedingungen und seine Beziehungen zu der durch eine Nährstoffzufuhr bedingten Ertragserhöhung. [The nitrogen, phosphoric acid, and potassium content of the oat plant under different conditions and their relations to the increased yield resulting from addition of nutrients.] *Jour. Landw.* 67: 1-57. 6 *fig.*, 15 *tables.* 1919.—Investigations are reported having to do with the nutrient content of plants as a measure of the fertilizer needs of the soil. Oat plants were grown in receptacles under different conditions as regards nutrients, water, and light. The results obtained serve as the basis for various calculations in which the formula of Mitscherlich [$\log (A-y) = k - c.x$] enters in the construction of yield-curves.—The authors believe that the plant-analysis may in extreme cases serve as a measure of the fertilizer needs of the soil, and that they have established a theoretical groundwork for the existing relation with respect to nitrogen, phosphorus and perhaps potassium.—C. E. Leighty.

1426. WILLAMAN, J. J. Mineral absorption in spinach. [Rev. of: TRUE, R. H., O. F. BLACK, AND J. W. KELLY. Ash absorption by spinach from concentrated soil solutions. *Jour. Agric. Res.* 16: 15-25. 1919 (See Bot. Absts. 2, Entry 1118).] *Bot. Gaz.* 68: 69-70. 1919.

PHOTOSYNTHESIS

1427. ANONYMOUS. Nature's factories for sugar and starch. *Sci. Amer. Supple.* 87: 223. 1919.—Photosynthesis discussed in a popular style.—Chas. H. Otis.

1428. BOYSEN-JENSEN, P. Studies on the production of matter in light and shadow plants. *Bot. Tidsskr.* 36: 219-259. *Fig. 1-7.* 1918.—In determining the amount of organic material or the increase in dry weight produced per unit time for *Sinapis alba* (light loving plant) and *Oxalis acetosella* (shade loving plant), Boysen-Jensen has measured the photosynthetic intensity. To measure the amount of CO_2 used in photosynthesis and that produced during respiration the absorption method with a few modifications has been employed. To estimate light intensity rhodamin B paper has been used. This, however, does not give other than com-

parative results. However, a light intensity which can darken Bunsen's silver chloride paper to the standard color in 1 second is taken as 100. For *Sinapis* the CO_2 intake is 6 mgm. CO_2 per 50 sq. cm. per hour at 20°C ., respiration 0.8 mgm. CO_2 per 50 c. cm. per hour at 20°C .. In 4 weeks there was an increase in the dry weight from 0.5 grams to 38 grams for 100 plants.—For *Oxalis* the CO_2 intake is only 0.8 mgm. per 50 sq. cm. per hour at 20°C ., while the respiration is 0.1 to 0.2 mgm. CO_2 per 50 c. cm. per hour. The daily per cent increase in dry matter is 2.1 per cent.—A. L. Bakke.

1429. BUDER, J. Zur Biologie des Bakteriopurpurins und der Purpurbakterien. [Contribution to the biology of the purple bacteria and their pigment.] Jahrb. Wiss. Bot. 58: 525-628. Pl. 5, fig. 1-5. 1919.—The paper contains a critical historical consideration of the purple bacteria, the groups of purple organisms, the pigments and their relation to the spectrum, and the connection between absorption and the physiological action of light rays of different wave lengths. The author's own researches were concerned mainly with the effect of light rays of different wave lengths on the movement of the bacteria. The fact that the pigments of the purple bacteria absorb the infra red, the yellow, and the green rays, that is, those regions of the spectrum which are not absorbed by the chlorophyll, enables these organisms to live in water underneath thick layers of vegetation. However, the bacteria grow as well or better in the open water where they may occur at greater depths than when shaded by vegetation. In conclusion, the author discusses the theories of Engelmann and Stahl in relation to the importance of the yellow pigments in assimilation. Although Iwanowski and Willstätter have denied any connection between the presence of these pigments and assimilation, the author seems to think that Stahl's theory still stands. The researches have shown that the selective absorption of the chromatophores of the purple bacteria is an established fact and of the greatest importance to the organisms.—E. F. Artschwager.

1430. CROCKER, WILLIAM. Photosynthesis. [Rev. of: OSTERHOUT, W. J. V., AND A. R. C. HAAS. Dynamical aspects of photosynthesis. Proc. Nation. Acad. Sci. 4: 85-91. 1918.] Bot. Gaz. 67: 182. 1919.

1431. EWART, ALFRED J. On chlorophyll, carotin and xanthophyll, and on the production of sugar from formaldehyde. Proc. Roy. Soc. Victoria (N. S.) 30: 178-209. 1918. [Received 1919.]—Chlorophyll acts as a light-energizing enzyme in the assimilation of CO_2 . It takes a direct part in the chemical changes which result in the formation of carotin, xanthophyll, phytol, and glaucophyllins as intermediate products and of glucose, levulose, formaldehyde and oxygen as end products. There is a continual reconstruction of the chlorophyll molecule during which a large part of the energy represented by the carbohydrate products is absorbed. Carotin, besides being protective, seems to be especially important in providing the massive hydrocarbon combination in the phytol radicle of chlorophyll which is necessary to convert the dicarboxylic glaucophyllin into the tricarboxylic chlorophyll. Xanthophyll was reduced to carotin by metallic reductases but no oxidase was found which would convert carotin into xanthophyll. A method is described for rapidly polymerizing formaldehyde to sugar; calcium and sodium tartrates were obtained as by-products. Equations are given to show how chlorophyll could act as a photic or lytase enzyme to convert CO_2 and H_2O into carbohydrates.—E. T. Bartholomew.

1432. OSTERHOUT, W. J. V. Apparatus for the study of photosynthesis and respiration. Bot. Gaz. 68: 60-62. 1 fig. July, 1919.—The photosynthesis and respiration of land plants may be studied by placing them in a chamber in which the gas can be made to bubble through an indicator. The changes in the color of the indicator indicate the changes in the tension of CO_2 . The method is reported serviceable for classroom demonstration as well as for investigation.—W. J. V. Osterhout.

1433. SCHRODER, H. Der Chemismus der Kohlensäureassimilation im Lichte neuer Arbeiten. [The chemistry of photosynthesis in the light of new researches.] Ber. Deutsch. Bot. Ges. 36: 9-27. 1919.—This paper is an attempt at a critical review of the modern con-

ceptions of photosynthesis, with the purpose of ascertaining whether the theories regarding the chemistry of carbon assimilation have been affirmed, extended, or disproven.—*Ernst Artschwager*.

METABOLISM (GENERAL)

1434. ANONYMOUS. Production of alcohol from algae. *Sci. Amer. Supplem.* 87: 153. 1919. —An experiment with *Laminaria digitata*.—*Chas. H. Otis*.

1435. ANONYMOUS [J. D.]. Recherches recentes sur la biochimie des hydrates de carbone. [Recent investigations of the biochemistry of the carbohydrates.] *Rev. Gén. Sci. Pures et Appliquées* 30: 363-364. 1919.—Condensed summary of many papers, English, French, and American.—*G. J. Peirce*.

1436. BACHMANN, FREDA M. Vitamine requirements of certain yeasts. *Jour. Biol. Chem.* 39: 235-257. *Pl. 1.* 1919.—Different yeasts vary in their needs for some organic matter other than sugar. Some grow in and ferment a solution containing sugar and inorganic salts only, even when they are introduced in small amounts. One yeast was found that required large amounts of organic matter other than sugar. The substances added to Nägeli's solution in order to enable this yeast to produce fermentation were found to be rich in vitamines, especially water-soluble B. A marked similarity exists between the substances required by this yeast and the vitamines necessary for the development of animals.—*G. B. Rigg*.

1437. COCKERELL, T. D. A. Notes on *Coelogyne*. *Torreyia* 19: 227-228. 1919.—This genus of orchids, including over a hundred species, is distributed from India to the New Hebrides. The black markings on the lip of *C. pandurata* Lindl., from Borneo, appear brown by transmitted light, and the pigment gives none of the anthocyanin reactions. It is suggested that these reactions resemble those of curcumin. Anthocyanin seems to be absent in all species of the genus.—*J. C. Nelson*.

1438. CROCKER, WILLIAM. Catalase, respiration, and vitamines. [Rev. of two papers: DUTCHER, R. ADAMS. Vitamine studies. I. Observations on the catalase activity of tissues in avian polyneuritis. *Jour. Biol. Chem.* 36: 63-72. 1918. APPLEMAN, C. O. Respiration and catalase activity in sweet corn. *Amer. Jour. Bot.* 5: 207-209. 1918.] *Bot. Gaz.* 67: 179-180. 1919.

1439. CROCKER, WILLIAM. Soil acidity. [Rev. of: HARTWELL, B. L., and F. B. PEMBER. The presence of aluminum as a reason for the difference in the effect of the so-called acid soil on barley and rye. *Soil Sci.* 6: 259-279. *Pl. 1.* 1918 (See *Bot. Absts.* 2, Entry 1137).] *Bot. Gaz.* 67: 519. 1919.—See *Bot. Absts.* 4, Entry 1650.

1440. CROCKER, WILLIAM. Fucosan vacuoles. [Rev. of: KYLIN, HERALD. Über die Fucosanblasen der Phaeophyceen. *Ber. Deutsch. Bot. Ges.* 36: 10-19. 1918 (See *Bot. Absts.* 2, Entry 573).] *Bot. Gaz.* 57: 518-519. 1919.

1441. CROCKER, WILLIAM. Fat storage in evergreen leaves. [Rev. of: MEYER, ARTHUR. Die angebliche Fettspeicherung immergrüner Laubblätter. *Ber. Deutsch. Bot. Ges.* 36: 5-10. 1918 (See *Bot. Absts.* 2, Entry 576).] *Bot. Gaz.* 67: 520. 1919.

1442. CROCKER, WILLIAM. Loss of chlorophyll. [Rev. of: MEYER, ARTHUR. Eiweissstoffwechsel und Vergilben der Laubblätter von *Tropaeolum majus*. *Festschrift zum Ernst Stahl. P. 85-127.* Jena, 1918.] *Bot. Gaz.* 67: 446-447. May, 1919.—Meyer has missed the initiating cause of the loss of chlorophyll, because of unsatisfactory cultural experiments and quantitative determinations, also because many of the phases are incompletely worked out, some of the gaps being filled with data drawn from other workers on very different materials. Schertz, in an unpublished paper from the Hull Botanical Laboratory, University of Chicago, finds that in *Coleus Blumei* shortage of nitrogen initiates all of the decomposition of nitrogen

compounds, and that it must be looked at as the immediate cause of the loss of chlorophyll; old leaves can be kept green by the addition of nitrogen fertilizer. It is also conceivable that a great excess of nitrogen may lead to the decomposition of chlorophyll, and that shortage of magnesium may act similarly. [See Bot. Absts. 2, Entry 574.]-H. C. Cowles.

1443. CROCKER, WILLIAM. Distribution of dissolved oxalates in phanerogams. [Rev. of: MOLISCH, HANS. Über den microchemischen Nachweis und die Verbreitung gelöster Oxalate im Pflanzenreiche. Flora 11-12: 60-70. 1918 (See Bot. Absts. 2, Entry 577).] Bot. Gaz. 68: 72. 1919.

1444. CROZIER, W. J. Intra-cellular acidity in Valonia. Amer. Jour. Physiol. 49: 147. 1919.—Three cubic centimeters or more of liquid were extracted from the vacuole of a single cell. In healthy cells the P_H value was 5.9, which was not materially changed even where the external reaction varied from P_H 6.6 to P_H 9.5. In death SO_4 penetrates the cell sap and increases the alkalinity to approximately that of sea water, P_H 8.1.—Ernest Shaw Reynolds.

1445. DE VRIES, O. Invloed van verandering van tapvlak op latex en rubber. [Influence of the change of tapping surface on the latex and rubber.] Arch. Rubbercult. Nederlandsch-Indië 3: 130-138. 1919.—See Bot. Absts. 3, Entry 2015.

1446. DODGE, C. W. Tyrosin in the fungi: Chemistry and methods of studying the tyrosinase reaction. Ann. Missouri Bot. Gard. 6: 71-92. 1919.—A chemical study of the action of tyrosinase, obtained from sporophores of *Daedalea confragosa*, *Armillaria mellea*, and *Polyporus sulphureus*, shows that tyrosin is not deaminized in the tyrosinase reaction but that the tyrosin molecule becomes more complex and the carboxyl groups are either split off or masked in the resulting molecule.—S. M. Zeller.

1447. DOWELL, C. T., AND P. MENOUL. The action of furfural and dextrose on amino-acids and protein hydrolysates. Jour. Biol. Chem. 40: 131-136. 1919.

1448. DUGGAR, B. M. The micro-colorimeter in the indicator method of hydrogen ion determination. Ann. Missouri Bot. Gard. 6: 179-181. 1919.—An adaptation of the Dubosq type of this instrument is described as admirably applicable for the testing of hydrogen ion concentration of pigmented fluids obtainable in small quantities only.—S. M. Zeller.

1449. DUGGAR, B. M., AND C. W. DODGE. The use of the colorimeter in the indicator method of H-ion determination with biological fluids. Ann. Missouri Bot. Gard. 6: 61-70. Fig. 1. 1919.—For each side of a complete Kober nephelometer-colorimeter there was arranged a pair of cups slipping to a certain depth one into the other. On the left hand side the colorless standard solution is used in the outer cup and the colored test fluid plus indicator in the inner. On the right hand side the colored test fluid is placed in the outer cup and the standard solution plus indicator in the inner. By this method difficulties in determining H-ion concentrations of colored solutions are largely overcome and the useful range of certain brilliant indicators extended so that fewer indicators may be employed.—S. M. Zeller.

1450. FALK, G. K. The carbohydrates of fresh and dehydrated vegetables. Jour. Indust. Eng. Chem. 11: 1133. 1919.—The results obtained indicate that no change in the carbohydrate distribution as determined (such as a break down of the more complex to the simpler constituents during dehydration) was observed.—Henry Schmitz.

1451. FENNEL, E. A., AND M. A. FISHER. Adjustment of reaction of culture mediums. Jour. Infect. Diseases 25: 444-451. 1919.—Bacteriologic culture media should be adjusted to a definite hydrogen ion concentration and not by the method of titration to phenolphthalein. The range of growth and that of optimum growth are given, in P_H values, for various pathogenic bacteria.—Selman A. Waksman.

1452. FRIEDRICH, OSCAR V. Undersökning över feta koniferoljor. I. Undersökning ab tallfröolja. [Investigations of fatty conifer oils. I. Investigations of pine seed oil—*Pinus silvestris* L.] Svensk Farm. Tidskr. 23: 445-451, 461-463. 1919.—See Bot. Absts. 4, Entry 425.

1453. FRIEDRICH, OSCAR V. Undersökningar över feta koniferoljor. II. Undersökning av granfröolja. [Investigations of fatty conifer oils. II. Investigation of spruce-seed oil—*Picea abies* Karsten.] Svensk Farm. Tidskr. 23: 500-505. 1919.—See Bot. Absts. 4, Entry 426.

1454. GRIEBEL, C., AND A. SCHÄFER. Zur Zusammensetzung der Inklusen, gleichzeitig ein Beitrag zur Kenntnis der Vorgänge beim Teigigwerden der Früchte. [The composition of "Inclusions" and the process of mellowing of fruits.] Zeitschr. Untersuch. Nahrungs-u. Genussmittel 37: 97-111. 1919.—"Inclusions" are tannin-containing intracellular bodies. The mesocarp of a number of fruits, chiefly varieties of pear, consists entirely of inclusions. With one known exception, they mellow rapidly. The disappearance of acid taste is not due to loss of tannin but to its becoming insoluble as a result of a kind of coagulation of the inclusions. The inclusions of domestic pears contain a tannin soluble in water and in alcohol, bound in part to a sparingly soluble colloid substance of unknown composition which forms the body of the inclusion. With the mellowing process are gradually formed brown colored products (Phlobasphen). Similar processes take place in other fruits which are rich in inclusions.—In the mellowing of pears acetaldehyde is formed. The pentosan and galactan content of the inclusions is very small, probably arising from the cell wall. Sugars have never been obtained by hydrolysis.—The reaction of the tannin from these inclusions with FeCl_3 and NaOH indicates the presence of a pyrocatechin derivative. A small amount of protocatechuic acid is present, but no phloroglucin. The tannin in question belongs to the oak bark group and does not possess a glucosidal character.—The violet color reaction of the inclusions with KOH has to do with the combination of tannin with the colloid body.—Inclusions have recently been found in the following varieties of fruits in nearly all cells of the mesocarp: *Pirus communis* L., *P. salicifolia* L., fil., *P. betulifolia* Bge., *P. amygdaliformis* Vill., *P. sinensis* Lindb., *P. pulcherrima* A. et G., *P. baccata* L. and *Prunus spinosa* L.—H. G. Barbour.

1455. HEPBURN, JOSEPH SAMUEL. The work of previous investigations on *Nepenthes*. Contrib. Bot. Lab. Univ. Pennsylvania 4: 419-442. 1919.—This is the first part of a series of four papers, which appear in the second part of the fourth volume of Contributions from the Botanical Laboratory of the University of Pennsylvania, on the pitcher liquors found in different species of *Nepenthes* and *Sarracenia*. As the title indicates, it is an account of previous work done on the liquors from *Nepenthes* pitchers and comprises reference to the chemical investigations and experiments of Voelcker, Hooker, Von Gorup and Will, Vines, Dubois, Couvreur, Tischutkin, Goebel, Clautriau, Fenner, Abderhalden and Teruuchi, Robinson, Jenny Hempel, Shibata and Nagai, and Pfeffer. It is an introduction to the papers which follow as the original contribution to the subject.—John W. Harshberger.

1456. HEPBURN, JOSEPH S., AND E. QUINTARD ST. JOHN. A bacteriological study of the pitcher liquors of *Nepenthes*. Contrib. Bot. Lab. Univ. Pennsylvania 4: 451-459. 1919.—This is the third paper in the series of studies of the pitcher liquor of *Nepenthes*. The investigation was started to prove or disprove the statement of some that the digestive action of the pitcher liquor of *Nepenthes* was due to the activity of micro-organisms. It was found that the liquor taken aseptically from unopened pitchers was sterile, while the liquor in partly opened pitchers free from insects contained a goodly number of bacteria. Liquor from open active pitchers, containing insect remains, had a bacterial count of from 48,000 to 8,000,000 per cubic centimeter. These organisms were rods and they were grown in pure culture to test their action on various media with the following conclusions. The slowness with which bacterial digestion of protein occurred shows that bacteria play but a secondary rôle in the digestion of insects in the pitcher. The leading rôle in the digestion is played by the protease of the pitcher liquor.—John W. Harshberger.

1457. IKEGUCHI, T. **A new sterol.** Jour. Biol. Chem. 40: 175-182. 1919.—A new sterol has been isolated from *Hydnium aspartum*, *Lycoperdon gemmatum*, and other species of fungi. It is regarded as probably occurring throughout all species of fungi, hence is named mycosterol.—G. B. Rigg.

1458. LEWIS, H. B. **The antiscorbutic value of the banana.** Jour. Biol. Chem. 40: 91-101. 1919.—Experiments suggest that a lower content of the antiscorbutic principle (bananas were used) may be sufficient to protect against scurvy if the diet is adequate in its content of the other essential dietary constituents. Guinea-pigs died when fed on bananas only.—G. B. Rigg.

1459. McCLENDON, J. F., AND WYMAN C. C. COLE. **The antiscorbutic properties of green malt.** Amer. Jour. Physiol. 49: 145-146. 1919.—“Malt had little antiscorbutic power before the acrospire projected beyond the grain, but had marked antiscorbutic power when the acrospire projected to a distance equal to the length of the grain.”—*Author's summary.*

1460. McCLENDON, J. F., W. C. C. COLE, O. ENGSTRAND, AND J. E. MIDDLEKAUFF. **The effects of malt and malt extracts on scurvy and the alkaline reserve of the blood.** Jour. Biol. Chem. 40: 243-258. Fig. 1-8. 1919.—Sprouted cereal grains are rich in antiscorbutic substance. The substance is not destroyed by heating to 70° to gelatinize the starch. It may be extracted from sprouted barley which has been crushed fine enough to rupture the cells of the acrospire.—G. B. Rigg.

1461. MELLANBY, JOHN. **The composition of starch. Part I. Precipitation by colloidal iron. Part II. Precipitation by iodine and electrolytes.** Biochem. Jour. 13: 28-36. 1919.—The author separates starch into three fractions by means of precipitation with colloidal iron. These three fractions, “a,” “b,” and “c,” form respectively, 8, 9, and 11 per cent of the starch granulose, “a” being precipitated by colloidal iron only, “b” by colloidal iron and electrolytes, and “c” not precipitated by colloidal iron under any conditions.—Precipitation by iodine and electrolytes shows (1), that starch contains an insoluble constituent not reacting with iodine (amylo-cellulose), (2) that all soluble constituents of starch are precipitated by iodine in the presence of electrolytes, and (3) that the final fraction precipitated by iodine gives the brown color.—Results tend to show that starch contains a variety of polymers varying in complexity from amylopectin to amylocellulose, the bulk of the granule being made up of amylogranulose.—A. R. Davis.

1462. MOLLIARD, MARIN. **L'ovalbumine constitue un aliment complet pour l'*Isaria densa*.** [Utilization of egg albumen by *Isaria densa*.] Compt. Rend. Acad. Sci. Paris 168: 523-524. 1919.—*Isaria densa* is capable of satisfying all its nutritive requirements on egg albumen. The commercial powder was dissolved in water and coagulated slowly, a mass of fine flakes resulting. This material, after being washed several times, served directly as the medium. Digestion of the albumen is more rapid when it is used alone than when sugar is added. The rate of oxidation was compared on three media: (1) albumen alone; (2) albumen plus Raulin's solution, and (3) the latter plus 2 per cent sucrose. Cultures were grown in sealed flasks provided with manometers. The respiratory quotient on albumen alone was 0.55; on medium no. 2 it was 0.63, and on no. 3 it was 0.82.—Oxalic acid is formed abundantly in the cultures. The rapid oxidation of the albumen is to be interpreted in the light of the small respiratory quotient and the formation of oxalic acid.—F. B. Wann.

1463. NAKAYAMA, Y. **Observations on streptolysin.** Jour. Infect. Diseases 25: 509-510. 1919.—Streptococci produce hemolysin successfully in plain broth with equal or larger quantities of serum. The hemolysin is filterable, although it loses somewhat in strength on filtration. With the increase of the virulence of streptococci, on successive animal passage, the production of hemolysin is increased, particularly in its action upon the corpuscles of the specific animal through which it has been passed.—Selman A. Waksman.

1464. OSBORNE, T. B., AND A. J. WAKEMAN. Extraction and concentration of the water-soluble vitamine from brewers' yeast. *Jour. Biol. Chem.* 40: 383-394. 1919.—An extract was obtained containing less than one-fifth of the yeast solids and nearly all of the water-soluble vitamine.—*G. B. Rigg.*

1465. PALMER, L. S., AND H. L. KEMPSTER. Relation of plant carotinoids to growth, fecundity and reproduction of fowls. *Jour. Biol. Chem.* 39: 299-312. *Pl. I.* 1919.—The yellow pigment of the yolk of hen's eggs is chemically identical with one of the xanthophyll group of plant carotinoids. The amount of xanthophyll in egg yolk, blood serum and body fat of a fowl is dependent upon the amount of xanthophyll in the food eaten. The natural yellow pigment of fowls which is derived from the xanthophyll of the food bears no important relation to growth or to the functions of fecundity and reproduction, at least for one generation.—*G. B. Rigg.*

1466. PALMER, L. S., AND H. L. KEMPSTER. The physiological relation between fecundity and the natural yellow pigmentation of certain breeds of fowls. *Jour. Biol. Chem.* 39: 313-330. *2 pl.* 1919.—The yellow pigment in shanks, ear lobes, and beaks of certain fowls such as leghorns and others is due to the presence of xanthophyll in the food. These parts lose their yellow color when the fowl is fed on food that is free from xanthophyll. The yellow pigment fades from these parts during fecundity because of the deflection of the normal path of the excretion of the xanthophyll from these parts of the skin to the egg yolk. The pigment in the parts of the skin mentioned is largely in granular form.—*G. B. Rigg.*

1467. PALMER, L. S., AND H. L. KEMPSTER. The influence of specific feeds and certain pigments on the color of the egg yolk and body fat of fowls. *Jour. Biol. Chem.* 39: 331-337. 1919.—Xanthophyll, fed in the form of yellow corn, has an immediate effect on the adipose tissue and visible skin parts of fowls of the type of white leghorns. Carotin and the orange-yellow pigment of annatto seed are without influence on the color of the adipose tissue of poultry. Yellow corn and green feed are rich in xanthophyll. A little of this pigment is found in hemp seed, barley, gluten feed, and red corn. Wheat, oats, cotton-seed meal, and rape seed contain negligible quantities of xanthophyll.—*G. B. Rigg.*

1468. PATSCHOVSKY, NORBERT. Über Nachweis, Lokalisierung und Verbreitung der Oxalsäure (gelösten Oxalate) im Pflanzenorganismus. [Occurrence, localization and distribution of oxalic acid (dissolved oxalates) in the plant.] *Ber. Deutsch. Bot. Ges.* 36: 542-548. 1918.—Calcium salts, such as the nitrates or chlorides which are used to determine the presence of dissolved oxalic acid in the plant cell, have the disadvantage that, in the precipitation of the calcium oxalate, tannins are also precipitated and hide the calcium salt. In ferrous sulphate, acidified with acetic acid, a reagent is found which precipitates the oxalic acid as lemon yellow ferro crystals, and at the same time imparts a blue or greenish color to the tannin. The reagent can be applied to microscopic sections directly or is allowed to be absorbed by the plant before sectioning. In the latter case it is necessary to use a relatively high concentration of the iron salt if the crystals are to be formed inside the cells. By using ferrous sulphate as a reagent, the occurrence and distribution of calcium oxalate and tannin was studied in a large number of plants.—*Ernst Artschwager.*

1469. PRINGSHEIM, HANS, AND HANS MAGNUS. Über den Acetylgehalt des Lignins. [Acetyl content of lignin.] *Zeitschr. Physiol. Chem.* 105: 179-186. 1919.—When wood or straw is treated with sodium hydrate in the cold all the acetic acid liberated is derived from the lignins of these materials. When these materials are boiled with sodium hydrate either under pressure or otherwise most of the acetic acid formed is derived from the lignins, but a small part is derived from the cellulose, and none from the pentoses. The lignin of the white beech yields about 37.85 per cent of its weight of acetic acid and the lignin of conifer wood about 19.48 per cent.—*William Crocker.*

1470. RUEDIGER, E. H. Exclusion of air in the cultivation of the *Gonococcus*. *Jour. Infect. Diseases* 24: 376-378. 1919.—The following medium is recommended for the isolation

and cultivation of *Gonococcus*: veal broth, neutral to phenolphthalein, agar, salt, peptone and 10 per cent human blood which had been heated to 56°C. for 30 minutes; the culture tubes were stoppered air-tight. Salt could be omitted; the addition of glycerol or dextrose or the omission of peptone seemed to be unfavorable.—*Selman A. Waksman*.

1471. RUPP, E., AND F. LEHMANN. Zur Titration von Zuckerarten. [Titration of sugars.] *Zeitschr. Untersuch. Nahrungs-u. Genussmittel* 37: 162-164. 1919.

1472. SCALES, F. M. The cuprous chloride-iodine method for reducing sugars simplified. *Jour. Indust. Eng. Chem.* 11: 747-750. 1919.—A method applicable for any reducing sugar is described for the determination of reduced copper by iodimetry in a modified Benedict's solution.—*Henry Schmitz*.

1473. SPERLICH, ADOLF. Jod, ein brauchbares mikrochemisches Reagens für Gerbstoffe, insbesondere zur Darstellung des Zusammenhanges in der Verteilung von Gerbstoff und Starke in pflanzlichen Geweben. [Iodine, a useful micro-chemical reagent for tannins, especially for proving the relation in the distribution of tannin and starch in plant tissues.] *Sitzungsber. K. Akad. Wiss. Wien. (Math.-Nat. Kl.)* 126: 103-153. 1 pl. 1917.—Free idoine, in traces, can penetrate the living plasma of the plant cell without harming it, and causes the tannins in solution in the cell sap to form firm and characteristic bodies of brownish color. These are apparently oxidation products belonging near or in the phlobaphene group. The greatest advantage in the use of this reagent lies in the simultaneous and definitely contrasted presentation of the starch and tannin under the microscope. Investigations with members of various groups of the flowering plants showed that in plants where both starch and tannins are present, they are not as a rule present in the same cell, and often the secretion and disorganization of the two substances run parallel. In tissues or tissue zones homogeneous as to content, one of the substances makes way for the other in the course of development. The opinion that all tannins are insignificant excretions, or perhaps protective excretions, should be discarded.—*V. C. Dunlap*.

1474. STEENBOCK, H. White corn vs. yellow corn, and a probable relation between the fat-soluble vitamine and yellow plant pigments. *Science* 50: 352-353. 1919.—Two years ago the writer experienced some difficulty in getting rats to rear their young on a ration which, to a considerable extent, consisted of corn. During the course of the past year a considerable amount of work dealing with the occurrence of the fat-soluble vitamine in roots was completed. It was indicated that colored roots such as carrots and sweet potatoes are rich in fat-soluble vitamines, while sugar beets, mangels, dasheens, and Irish potatoes contain little or none of it. It was then recalled that when the difficulty with female rats to rear their young had been observed it had been impossible to obtain sound yellow corn, and white corn had been used. It has now been demonstrated with eight different varieties of corn grown in the middle west, that while white corn contains no demonstrable amounts of fat-soluble vitamine, yellow corn may contain sufficient amounts to allow normal growth and reproduction in the rat. These relations suggested the possibility of correlating other instances of the simultaneous occurrence of fat-soluble vitamine and yellow plant pigments, such as oleo oils and butter fat. From evidence it appears reasonably safe, at least as a working hypothesis, to assume that the fat-soluble vitamine is a yellow plant pigment, or a closely related compound.—*A. H. Chivers*.

1475. STEENBOCK, H., AND E. G. GROSS. Fat-soluble vitamine. II. The fat-soluble vitamine content of roots, together with some observations on their water-soluble vitamine content. *Jour. Biol. Chem.* 40: 501-531. Pl. 1. 1919.—The fat-soluble content is high in carrots and yellow sweet potatoes as compared with red beets, parsnips, rutabagas, sugar beets, potatoes, mangels, and dasheens. Absolute comparisons of the amounts of the vitamine found in different plant materials are impossible until we know something of its association with specific principles or physiological processes in plants.—*G. B. Rigg*.

1476. SUGIURA, K., AND S. R. BENEDICT. The nutritive value of the banana. *Jour. Biol. Chem.* 40: 449-468. 1919.—The experiments performed suggest that bananas and milk in proper proportion constitute a complete food for albino rats.—*G. B. Rigg.*

1477. TEN HOUTE DE LANGE, W. G., JR. Rubberproductie-Krommen. [Rubber production curves.] *Arch. Rubbercult. Nederlandsch-Indië* 2: 105-111. 1918.—See *Bot. Absts.* 3, Entry 2060.

1478. TRUOG, EMIL, AND M. R. MEACHAM. Soil acidity: II. Its relation to the acidity of the plant juices. *Soil Sci.* 7: 469-474. 1919.—See *Bot. Absts.* 4, Entry 1659.

1479. WAGER, HAROLD. A fluorescent colouring matter from *Leptonia incana* Gill. *Trans. British Mycol. Soc.* 6: 158-164. 1919.—See *Bot. Absts.* 4, Entry 1178.

1480. WEINHAGEN, ALBERT B. Beiträge zur Muscarin-Frage. I Mitteil. Zur Kenntnis der Platindoppelsalz einiger Basen. [The muscarine problem; the platinum double salts of certain bases.] *Zeitschr. Physiol. Chem.* 105: 249-257. 1919.

1481. WHITE, H. L. The modification of the composition of vegetable oils, with special reference to increasing unsaturation. *Jour. Indust. Eng. Chem.* 11: 648-651. 1919.—The processes of germination and growth of soy beans up to a height of 8 to 12 cm., even under favorable conditions of growth, do not result in an increase of unsaturated acids in the ether extract from such plants. The effect of heat, light, enzymes, and salts of some metals on the degree of unsaturation of vegetable oils is also dealt with.—*Henry Schmitz.*

1482. WILLAMAN, J. J., R. M. WEST, D. O. SPRIESTERSBACH, AND G. E. HOLM. Notes on the composition of the sorghum plant. *Jour. Agric. Res.* 13: 1-33. 1919.—Three varieties of sorghum cane were used. A continual increase in dry matter up to maturity was found; also a decrease in crude fiber at the same rate that soluble carbohydrates increase. The percentages of fat, ash, and protein remain constant throughout the period of growth studied.—The data indicate that the plant builds up in the earlier part of the season its cellular structure of fiber, protein, and mineral matter, and that these tissues are filled with carbohydrates in the later stages of growth.—There is no evidence that the leaves are deprived of carbohydrates to supply the stalk. In the juice, galactan, pentosans, and mineral matter (largely calcium, potassium, and magnesium) occur. Such organic acids as aconitic, malic, citric, tartaric, and oxalic were found in the juice. Amid nitrogen was also high in the sorghum juice, other juice constituents were 1-leucin, d-1-asparagin, glutamin, cystin, and aspartic acid.—“The middle joints of the cane are higher in total sugars but lower in dextrose and in levulose than the upper and lower joints.” The sorghums grown in the northern regions are lower in sugars than in the southern, warmer regions.—*J. M. Brannon.*

1483. WINTERSTEIN, E. Über das Vicin. I Mitteil. [Vicin.] *Zeitschr. Physiol. Chem.* 105: 258-264. 1919.

1484. ZELLER, S. M., AND HENRY SCHMITZ. Studies in the physiology of the fungi. VIII. Mixed Cultures. *Ann. Missouri Bot. Gard.* 6: 183-192. *Pl.* 4. 1919.—Mixed cultures of several Basidiomycetes and Hyphomycetes were grown upon potato agar plates and observations made upon their ability to inhibit or stimulate the growth of one another. The fungi were also grown separately on a nutrient solution containing the same ingredients as the agar. Some of the observations lead to the following conclusions: (1) There is no definite relation between the active acidity produced by the fungi and the inhibition and stimulation of growth. (2) In some cases, at least, inhibition of growth is due to depletion of carbohydrate. (3) The tendency of growth away from “staled” media is more probable than growth toward diffusion centers.—*S. M. Zeller.*

1485. ZERBAN, F. W. The color changes of sugar cane and the nature of cane tannin. *Jour. Indust. Eng. Chem.* 11: 1034-1036. 1919.—The polyphenol of the sugar cane giving a

green color with ferric salts is not pyrocatechin. It is a true tannin, giving a precipitate with gelatin, and is, like the oak tannins, derived from pyrocatechin, not from pyrogallol. Heat alone produces pyrocatechin, and no pyrogallol; dilute acids give rise to a phlobaphene and protocathechuic acid, but no ellagic or gallic acids; potash fusion yields protocathechuic acid and acetic acids, but no gallic acid or phloroglucin.—*Henry Schmitz.*

METABOLISM (NITROGEN RELATIONS)

1486. ALLEN, E. R., AND B. S. DAVISSON. *An all-glass nitrogen apparatus.* *Ann. Missouri Bot. Gard.* 6: 45-48. *Pl. 2.* 1919.—An all-glass nitrogen apparatus was devised for use in nitrogen determinations in connection with the study of the metabolism of soil bacteria and general plant metabolism. Special features of the described apparatus are the absence of rubber connections, the efficient scrubbing of the entrained alkali from the steam, and the use of Pyrex glass which does not yield an appreciable amount of alkali to steam or boiling solutions.—*S. M. Zeller.*

1487. ALLEN, E. R., AND B. S. DAVISSON. *On the relative accuracy of colorimetric and titrimetric procedures for determining nitrogen as ammonia.* *Jour. Biol. Chem.* 40: 183-197. 1919.—Colorimetric procedures in the determination of nitrogen are of service because of their brevity, but except when dealing with minute amounts of nitrogen, titrimetric methods should be chosen where exact results are required.—*G. B. Rigg.*

1488. BOTTOMLEY, W. B. *Nucleic derivatives from peat.* *Jour. Amer. Peat Soc.* 12: 226. 1919.—British patent 124329 covers the preparation of nucleic acid and nucleates from peat by means of alkaline solutions.—*G. B. Rigg.*

1489. BRACEWELL, RUSSELL S. *The molecular mechanism of colloidal behavior. III. The chemical nature of the adsorption of acids and alkalies by the protein molecule.* *Jour. Amer. Chem. Soc.* 41: 1511-1515. 1919.—The author's work showed that with strong acids and alkalies there is a fairly definite maximum number of equivalents of acid or base adsorbed by fibrin, but the adsorption is not increased greatly by increasing the concentration of the supernatant solution. This supports the idea that adsorption depends on chemical factors.—*J. M. Brannon.*

1490. CONN, H. J., AND J. W. BRIGHT. *Ammonification of manure in soil.* *New York Agric. Exp. Sta. [Geneva] Tech. Bull.* 67. 45 p. 1919.—See Bot. Absts. 3, Entry 850; 4, Entry 1643.

1491. CROCKER, WILLIAM. *Reaction of the medium and nitrogen assimilating organisms.* [Rev. of: FRED, E. B., AND AUDREY DAVENPORT. *Influence of reaction on nitrogen-assimilating bacteria.* *Jour. Agric. Res.* 14: 317-336. 1918 (See Bot. Absts. 2, Entry 169).] *Bot. Gaz.* 67: 277. 1919.—The reviewer regrets that the reaction was not determined by the gas chain as well as by the colorimetric method.—*H. C. Cowles.*

1492. CROCKER, WILLIAM. *Nitrogen fixation by Azotobacter.* [Rev. of: HUTCHINSON, H. B. *The influence of plant residues on nitrogen fixation and on losses of nitrate in the soil.* *Jour. Agric. Sci.* 9: 92-111. 1918 (See Bot. Absts. 2, Entry 583).] *Bot. Gaz.* 67: 518. 1919.

1493. EDLBACKER, S. *Notiz über eine Farbreaktion der Eiweisskörper. [A color test for albumen.]* *Zeitschr. Physiol. Chem.* 105: 240-241. 1919.—This new test is very similar to the glyoxylic reaction and seems to be conditioned by the presence of tryptophan.—*William Crocker.*

1494. GRÜNHUT, L. *Die Bestimmung des Aminosäuren-Stickstoffs, insbesondere in Suppenwürzen und Ersatzbrühwürfeln. [Determination of amino-acid nitrogen.]* *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 37: 204-324. 1919.

1495. HILLER, ALMA, AND D. D. VAN SLYKE. Direct determination of non-amino nitrogen in the products of protein hydrolysis. Jour. Biol. Chem. 39: 479-488. 1919.

1496. JONES, D. B., AND C. O. JOHNS. The hydrolysis of stizolobin, the globulin of the Chinese velvet bean, *Stizolobium niveum*. Jour. Biol. Chem. 40: 435-448. 1919.—The globulin was hydrolyzed and the resulting amino-acids determined. Glutaminic acid, aspartic acid, leucine, and lysine are the most abundant ones.—*G. B. Rigg*.

1497. KOESSLER, K. K., AND M. T. HANKE. Studies on proteinogenous amines. II. A microchemical colorimetric method for estimating imidezole derivatives. Jour. Biol. Chem. 39: 497-519. 1919.

1498. KOESSLER, K. K., AND M. T. HANKE. Studies on proteinogenous amines. IV. The production of histamine from histidine by *Bacillus coli communis*. Jour. Biol. Chem. 39: 539-584. 1919.

1499. MEYER, ARTH. Die Beziehung zwischen Eiweiss- und Säurebildung in Laubblättern. [Relation between synthesis of proteins and formation of acid in leaves.] Ber. Deutsch. Bot. Ges. 36: 508-514. 1919.—1. In the presence of carbohydrates, small amounts of protein are synthesized in the dark; but much larger amounts in the light. The presence or absence of CO₂ does not influence this process. Leaves devoid of chlorophyll do not synthesize protein in either case. 2. The acidity of the leaf decreases slightly in the dark, very rapidly in the light, and hardly at all in leaves devoid of chlorophyll; the presence or absence of CO₂ has no influence. 3. Shaded leaves show only a small amount of calcium oxalate; increase in light intensity increases the calcium oxalate content. This process is independent of the CO₂ content of the atmosphere. Protein synthesis, decrease in acidity, and the appearance of calcium oxalate in the leaves are closely correlated. The green leaves which synthesize a large amount of protein in the light obtain the ions for the building up of the protein molecule from the carbohydrates and the inorganic salts. The bases of these salts are set free and are neutralized by organic acids produced in the leaves. The organic acids are usually formed in quantities sufficient to neutralize the free bases. Sometime, however, an excess of the acid is produced, due to a prolonged effect of the stimulation of the acid on the protoplast. The oxygen set free in protein synthesis is either used in synthesis of organic acids from carbohydrates or is liberated as free O₂.—*Ernst Artschwager*.

1500. PETERS, A. W. The micro determination of nitrogen by direct Nesslerization and of total solids in drop quantities of human blood. Jour. Biol. Chem. 39: 285-298. 1919.—A method is described for the determination of total solids and of total and non-protein nitrogen in fifteen to thirty drop quantities of human blood.—*G. B. Rigg*.

1501. WILLAMAN, J. J. Nitrogen fixation. [Rev. of: ALLEN, E. R. Some conditions affecting the growth and activities of *Azotobacter chroococcum*. Ann. Missouri Bot. Gard. 6: 1-44. 1919 (See Bot. Absts. 4, Entry 1532).] Bot. Gaz. 68: 71-72. 1919.

METABOLISM (ENZYMES, FERMENTATION)

1502. ANONYMOUS. [Rev. of: COFF, JOHN R., W. V. LINDER, AND G. F. BEYER. Production of glycerine from sugar by fermentation. Jour. Indust. Eng. Chem. 11: 842-845. 1919.] Jour. Franklin Inst. 188: 575. 1919.—A molasses solution made alkaline and held at about 30° to 32°C. gave with the Steinberg variety of *Saccharomyces ellipsoideus* a yield of glycerine equal to 20 to 25 per cent of the sugar. Corn sugar and cane sugar gave poorer yields.—*Ernest Shaw Reynolds*.

1503. ANONYMOUS. Alcoholic fermentation of banana-must. Sci. Amer. Supplem. 87: 233. 1919.

1504. BODANSKY, M. A note on the determination of catalase in blood. *Jour. Biol. Chem.* 40: 127-130. 1919.—There seems to be no satisfactory absolute method for the determination of catalase. Temperature and P_H values are important factors, and there is no well defined P_H value for maximum action.—*G. B. Rigg.*

1505. EDIE, EDWARD STAFFORD. The effect of alcohol on the digestion of fibrin and caseinogen by trypsin. *Biochem. Jour.* 13: 219-225. 1919.—The action of trypsin on fibrin is inhibited when alcohol is present to the extent of 3 per cent while the digestion of caseinogen by the same enzyme is not effected until the alcohol concentration reaches 10 per cent. The author concludes the harmful action is not due to the destruction of trypsin by alcohol since dilute alcohol seems to aid digestion. The suggestion is made that if trypsin is a single enzyme, the digestion of fibrin and caseinogen is probably carried out by side chains, those digesting fibrins being more readily effected by alcohol than others.—*A. R. Davis.*

1506. EULER, HANS V., AND RAGNAR BLIX. Verstärkung der Katalasewirkung in Hefezellen. [Accelerating catalase action in yeast cells.] *Zeitschr. Physiol. Chem.* 105: 83-114. 1919.—The authors have determined the effect of various conditions and reagents upon the catalase activity of yeast cells. Where possible they used the potassium permanganate titration method for determining catalase activity. In cases where additions of thymol, glucose, etc., rendered the permanganate method inaccurate, the volumetric method was used. They used mainly their cultures of distillery top yeast S. B. II. Some experiments were run with brewery bottom yeast. They agree with Phragmen's findings that yeast splits dilute solutions of hydrogen peroxide without secreting a soluble enzyme into the bathing fluid. The reaction is one of the first order. The reaction constant increases in proportion to the amount of yeast. Small amounts of protoplasmic poisons (toluol or chloroform) raise the catalase activity of these cells six-fold. When cells were dried in the air or otherwise without injuring them the catalase activity rose ten to fifteen fold. When emulsions of the yeast were heated $\frac{1}{2}$ to 2 hours at 55° to 63°C. the catalase activity rose twenty to thirty fold. The activation by heating is greatly influenced by reagents in the emulsion at the time of heating. Similar activation of catalase has been demonstrated in a number of other microorganisms. The catalase activity of yeast can be raised by previous treatment with sugar solutions. This increased catalase activity is not due to increased permeability of the cells to catalase, but is an activation within the living cells. The reaction constant is not a measure for the catalase content of the cells.—*William Crocker.*

1507. EULER, H., AND O. SVANBERG. Enzymatische Studien über Zuckerspaltungen. [Enzymatic studies on sugar fermentation.] *Zeitschr. Physiol. Chem.* 105: 187-239. 1919.—Euler and Svanberg made a study of alcoholic fermentation in an alkaline medium in which $P_H = 8$. Top yeast and *Torula* gave about equal weights of carbon dioxide and alcohol, each equal to 30 to 33 per cent of the weight of the sugar fermented. Glucose, fructose, and invert sugar were fermented with about equal speed, mannose about 30 per cent as fast, and galactose very slowly. Invertase is active in this medium and maltase inactive. The following are the maximum alkalinities in which cell division occurs in the various yeasts. Froberg Unterhefe H, $P_H = 7.7-8.0$; Brennerei-Oberhefe S. B. II, $P_H = 7.3-8.4$; *Saccharomyces ellipsoideus*, $P_H = 7.9$; *Pseudosaccharomyces apiculatus*, $P_H = 7.6$. Increase in weight occurred in S. B. II up to $P_H = 8.5$. For Froberg Unterhefe H the full curve of acid sensitivity was worked out and the optimum was found to be at $P_H = 5$.—*William Crocker.*

1508. FISHER, ERNEST ARTHUR. Contributions to the study of the vegetable proteases. I. Introductory. *Biochem. Jour.* 13: 124-134. 1919.—This investigation has to do with the determination of proteoclastic enzymes in leaves and other parts of certain farm crops as well as a study of their resemblance, if any, to seed proteases. Fourteen crops were studied, including barley, oats, maize, rye, red clover, white clover, lucerne, vetch, field beans, peas, buckwheat, white mustard. The Sörenson method of determining proteolysis by formation of free carboxyl groups was employed and a detailed description of technique is given. The author finds that all plants examined showed a protease capable of splitting Witte's peptone

into simple amino-acids. This activity varies with the nature of the plant, but is individual rather than generic.—Legumes did not, on the whole, show greater activity than non-legumes, although the activity of foliage of young field peas was about $2\frac{1}{2}$ times that of young oats. White mustard, especially in the flowering stage, was more active than the other plants, except peas. In general, activity was greater at the flowering stage, than earlier.—Both protease and peptase activity of the leaves increase with maturity to the time of harvesting, and does not fall off when translocation of foodstuffs takes place and during dying of leaves.—*A. R. Davis.*

1509. FRED, E. B., W. H. PETERSON, AND A. DAVENPORT. Acid fermentation of xylose. *Jour. Biol. Chem.* 29: 347-384. Pl. 1. 1919.—Xylose is readily fermented by bacteria which are found in fresh silage, sauerkraut, manure, and certain soils. These xylose fermenters are easily isolated in pure culture. The fermentation of xylose takes place either in the presence of free oxygen or in a limited supply. The main products formed in the fermentation of xylose are acetic acid and lactic acid. The fermentation is rapid, practically all of the xylose disappearing within 10 or 12 days after inoculation.—*G. B. Rigg.*

1510. GURJAR, A. M. Enzyme action. [Rev. of: VAN LAER, HENRI. *Actions entre enzymes.* Zeitschr. Gärungsphysiol. 6: 169-175. 1918 (See Bot. Absts. 3, Entry 2882).] *Bot. Gaz.* 67: 515. 1919.

1511. HEPBURN, JOSEPH SAMUEL. A study of the protease of the pitcher liquor of *Nepenthes*. *Contrib. Bot. Lab. Univ. Pennsylvania* 4: 442-450. 1919.—The formol titration showed that the liquor from stimulated pitchers produced proteolysis of ovalbumen, fibrin, ovomucoid, Nährstoff-Heyden, and Witte peptone, while the liquor from non-stimulated pitchers lacked proteolytic power. This method also showed that, in the presence of very dilute hydrochloric acid, edestan was digested by the liquor from stimulated pitchers, but not by that from non-stimulated pitchers. Carmine fibrin was dissolved by the liquor from both stimulated and non-stimulated pitchers, in the presence of 0.2 per cent hydrochloric acid. The protein derived from the globulin of the castor bean was usually dissolved by the liquor from both stimulated and non-stimulated pitchers in the presence of hydrochloric acid. The liquor from stimulated pitchers apparently hydrolyzed glycyltryptophane, provided the period of incubation was sufficiently long. The liquor from stimulated pitchers possessed proteolytic power in both the absence and the presence of acid, while that from the non-stimulated pitchers exerted no proteolytic power in the absence of acid, but had such power when acids were present. The proteolytic enzyme of the pitcher liquor undoubtedly plays a highly important rôle in the digestion of insects within the pitcher.—*John W. Harshberger.*

1512. HEPBURN, JOSEPH SAMUEL, AND FRANK MORTON JONES. Occurrence of antiproteases in the larvae of the *Sarcophaga* associates of *Sarracenia flava*. *Contrib. Bot. Lab. Univ. Pennsylvania* 4: 460-463. 1919.—The pitcher liquor of *Sarracenia flava* contains a proteolytic enzyme. The larvae of certain species of *Sarcophaga* (*S. sarraceniae* Riley, *S. Rileyi* Aldrich, and *S. Jonesi* Aldrich) habitually occur in the pitchers of *Sarracenia flava*, where they are constantly bathed in the digestive liquor of the pitcher. This phenomenon suggested the examination of *Sarcophaga* larvae from *Sarracenia* for the presence of anti-proteases. After an account of the experiments the authors conclude: "In this study, antiproteases have been found in the larvae of the *Sarcophaga* associates of the pitcher plant, *Sarracenia flava*. The larvae of other species of *Sarcophaga*, and of several other dipterous genera, are likewise able to live and escape digestion in an environment rich in proteolytic enzymes; probably these larvae also contain antiproteases which protect them from digestion."—*John W. Harshberger.*

1513. KOPELOFF, NICHOLAS, AND LILLIAN KOPELOFF. Do mold spores contain enzymes? *Jour. Agric. Res.* 18: 195-209. 1919.—This is a study with special reference to invertase in the spores of *Aspergillus niger*, *A. Sydowi*, *A. flavus*, and *Penicillium expansum*. Spores of these species heated to 63°C. for 30 minutes and shaken in sterilized sand caused a decrease in polarization and an increase in reducing sugars in a 10 per cent sugar solution in 3 hours and

continued to cause the same changes throughout a 4-day incubation period at 45°. Increase in the number of spores resulted in an increase in enzymic activity. The enzyme present exhibited the characters of invertase. The spores of *A. Sydowi* contain a gum-forming enzyme which parallels invertase activity.—The limit of concentration, when 100,000 to 400,000 mold spores per cubic centimeter of sugar solution are used, is between 18 and 24 per cent actual sucrose.—*D. Reddick.*

1514. MCGINTY, R. A. Diastase activity in relation to stage of development and carbohydrate content of the tuber of *Solanum tuberosum*. *Ann. Missouri Bot. Gard.* 6: 223-251. 1919.—Following a review of the literature on this subject there are reported results on experiments (1) to determine diastase activity in tubers at various periods of development; (2) to estimate the reducing sugars and sucrose by the method formulated by Davis, Daish, and Sawyer; and (3) to estimate starch by means of taka diastase. Diastase activity and starch content increase with the advance of tuber formation, while the sugar content decreases. Potato juice preserved with toluol for 24 hours at room temperature showed a marked decrease in diastatic activity. An activating agent which is not destroyed by boiling nor precipitated by alcohol is coenzymic with the diastase of potato juice.—*S. M. Zeller.*

1515. NORTHROP, J. H., L. H. ASHE, AND R. R. MORGAN. A fermentation process for the production of acetone and ethyl alcohol. *Jour. Indust. Eng. Chem.* 11: 723-727. 1919.—A commercial method for the manufacture of acetone and ethyl alcohol by means of a fermentation process of various sugars induced by a newly described organism, *Bacillus acetoehtylicum*, is discussed.—*Henry Schmitz.*

1516. ONSLOW, MURIEL WHELDALE. Oxidizing enzymes. I. The nature of the "Peroxide" naturally associated with certain direct oxidizing systems in plants. *Biochem. Jour.* 13: 1-9. 1919.—A relationship is shown between the browning of injured tissue of certain plants and a direct oxidase reaction with guaiacum, likewise between those showing no browning and the direct oxidase reaction (requiring the presence of hydrogen peroxide). It is argued from experimental data that the direct oxidase reaction in tissues showing browning (such as pear fruit or potato tuber), is due to the presence of a peroxidase and an aromatic catechol group. On injury the peroxidase activates the oxidation of the aromatic with the formation of a peroxide, this system then bringing about the bluing of guaiacum.—The formation of the peroxidase-peroxide system can be prevented by the extraction of the aromatic, then reformation may be effected by again introducing the aromatic. It is held that plants not showing browning of tissue do not contain the catechol group.—*A. R. Davis.*

1517. PRINGSHEIM, HANS, AND ADELHEID MAGNUS-VON MERKATZ. Fermentversuche an Zellulose abbauprodukten. [Fermentation experiments with certain products of cellulose disintegration.] *Zeitschr. Physiol. Chem.* 105: 173-178. 1919.—Pringsheim and Magnus-von Merkatz point out the fact that dextrines from both starch and glycogen are split to maltose by diastase. They raise the question whether diastase has a similar effect on cellulose dextrine. By using Madsen's acetylation method they gained cellulose dextrine from cotton that was soluble in water and gave no osazone reaction. The dextrine thus obtained is strongly reducing to Fehling's solution and is considered by the authors as the end dextrine of cellulose. Diastase will not split cellulose dextrine. They also derived zellobiose by the Madsen method. The contents of the first stomach of cattle, the intestine and the pancreas bore no enzyme that would split zellobiose. They conclude that the splitting of this substance in the alimentary canal of the cattle must be due to cellulose bacteria.—*William Crocker.*

1518. SCHMITZ, HENRY. Studies in the physiology of the fungi. VI. The relation of bacteria to cellulose fermentation induced by fungi, with special reference to the decay of wood. *Ann. Missouri Bot. Gard.* 6: 93-136. 1919.—Sawdust cultures, prepared from heart-wood of Douglas fir, western hemlock, white ash, and red oak, were inoculated with pure and mixed cultures of the following fungi and bacteria: *Fomes pinicola*, *Lenzites saepiaria*, *Polystictus versicolor*, *Bacillus vulgatus*, *B. vulgaris*, *B. coli*, *B. prodigiosus*, *Bacterium mycoides*, and

Azotobacter chroococcum. Some attention was given to the effect of autoclaving on wood. The percentage loss in weight in the sawdust was taken as a criterion of the rate of decay. A summary of the observations and experiments shows that (1) when wood is subjected to steam-pressure sterilization it is changed in color and resistance to decay and is accompanied by an increase in acidity and substances in the extract which reduce Fehling's solution. Under natural conditions cellulose-dissolving bacteria play no important part in the decay of wood although the rate of decay may be materially increased by the presence of the ordinary saprophytic bacteria. The decay of wood by fungi, as influenced by bacteria, is dependent on the fungus and wood species.—*S. M. Zeller*.

1519. SCHMITZ, HENRY, AND S. M. ZELLER. Studies in the physiology of the fungi. IX. Enzyme action in *Armillaria mellea* Vahl, *Daedalea confragosa* (Bolt.) Fr., and *Polyporus lucidus* (Leys.) Fr. Ann. Missouri Bot. Gard. 6: 193-200. 1919.—The evident presence of lactase is the outstanding feature of the results on carbohydrates, this being the first record of its presence in higher fungi. A method involving hydrogen ion concentration determination is suggested for the detection of ammonia liberated by amidase.—*S. M. Zeller*.

1520. SHERMAN, N. C., AND DORA E. NEUM. The proteolytic activity of pancreatic amylase preparations. Jour. Amer. Chem. Soc. 41: 1855-1862. 1919.—In a previous paper the authors showed that their purified pancreatic amylase preparations exhibited marked proteolytic activity. The authors purified high grade commercial pancreatin by extracting with 50 per cent alcohol, precipitating this filtrate with alcohol-ether mixture, dissolving the precipitate with H₂O and precipitating with absolute alcohol, then dissolving and dialyzing in 50 per cent alcohol containing maltose to retard deterioration, and finally precipitating with an equal volume of 1:1 alcohol-ether mixture. To discover whether the amylase and protease activities are due to admixed substances, the authors substituted for the usual final precipitation with 1:1 alcohol-ether, a precipitation with an equal volume of a mixture of two parts alcohol to one of ether. The products obtained are called A. Another product B was obtained by adding more ether. A was separated by centrifugal force, the centrifuge being cooled with liquid air. The solution from precipitate A was decanted. "Typically the amylolytic activity of precipitate A was lower than that of precipitate B; but the latter was not more active than our usual amylase preparations. The proteolytic activity was higher in precipitate A than in precipitate B."—*J. M. Brannon*.

1521. SHERMAN, H. C., AND FLORENCE WALKER. Influence of aspartic acid and asparagin upon the enzymic hydrolysis of starch. Jour. Amer. Chem. Soc. 41: 1866-1873. 1919.—The starches used were potato, maize, and rice purified by washing in cold, very dilute sodium hydroxide and water. Merck's "soluble starch according to Lintner" washed nine times with ordinary distilled water and six times with triply distilled water was also employed. One hundred cubic centimeters of a 1 per cent dispersion, made neutral to rosolic acid with 0.01 N alkali or acid, were used for each digestion. The water extract of potato was obtained by letting one grated potato stand over night in 150 cc. of purified distilled water. This was filtered and the filtrate boiled. Its acidity was carefully determined, rosolic acid being used as an indicator. Other methods of procedure have been described in previous papers. "The action of saliva, pancreatin and purified pancreatic amylase on alkali-washed potato, wheat, maize and rice starches and Lintner's 'soluble' starch was accelerated by the addition of small amounts of boiled, neutralized water extract of potato, while the action of the vegetable amylases tested was not influenced." Neutralized aspartic acid or asparagin accelerated the action of saliva, pancreatin, and purified pancreatic and malt amylases. No clear evidence of activation was obtained from malt extract of *Aspergillus Oryzae*. The addition of sodium aspartate or asparagin produced practically the same activation.—*J. M. Brannon*.

1522. SHULL, C. A. Enzyme secretion. [Rev. of: ROBBINS, W. J. Influence of certain salts and nutrient solutions on the secretion of diastase by *Penicillium camembertii*. Amer. Jour. Bot. 3: 234-260. 1916.] Bot. Gaz. 67: 276-277. 1919.

1523. STEHLE, R. L. Some data concerning the alleged relation of catalase to animal oxidations. Jour. Biol. Chem. 39: 403-420. 1919.—Until catalase has been shown to produce at least some of the changes which food or tissue undergoes in oxidative catabolism, the discovery that the quantity in which it exists in various tissues runs parallel with the oxidative activity of those tissues is not evidence that it takes part in those oxidations. An explanation is suggested for the variation in catalase content and the experimental evidence for the explanation is given. The explanation is that fluctuations in catalase content are due to fluctuations in the number of red cells in the blood. It seems simpler to regard catalase content as a function of the number of red cells than to assume a direct relation between catalase and biological oxidations.—G. B. Rigg.

1524. WOLF, CHARLES G. L. Contributions to the biochemistry of pathogenic anaerobes. VI. The proteolytic action of *Bacillus sporogenes* (Metchnikoff) and *Bacillus welchii*. Jour. Path. and Bact. 22: 270-288. 1919.—On a medium of sterilized muscle and water both organisms grow with great rapidity, and both form large quantities of carbon dioxide and hydrogen. With *B. sporogenes* about 70 to 75 per cent of the gas is carbon dioxide; with *B. welchii* about 38 per cent. The amount of gas formed per litre of medium is apparently about equal with both organisms. *B. sporogenes* has great proteolytic activity; with *B. welchii* there is relatively little proteolysis. A marked difference in volatile acid production was noted. *B. welchii* produces large quantities of such acids in carbohydrate-containing media, but no considerable amount with muscle tissue. *B. sporogenes* is capable of forming acids in quantity in any medium, irrespective of the carbohydrate content.—W. W. Bonns.

METABOLISM (RESPIRATION)

1525. ANONYMOUS. Do seeds breathe? Sci. Amer. 120: 571. 1919.

1526. BAUMGÄRTEL, OTTO. Studien über Pneumatocarpien. [Studies of inflated fruits.] Sitzungsber. K. Akad. Wiss. Wien (Math.-Nat. Kl.) 126: 13-40. Pl. 1, fig. 1-4. 1917.—The bladder fruits (pneumatocarpies) of *Astragalus cicer* L., *Colutea halepica* Lam., *C. orientalis* Mill., *Nigella damascena* L., *Staphylea Bumaldea* D.C., and *S. pinnata* L. were studied from an anatomical and physiological standpoint. It was found that these inflated fruits contain a higher atmospheric pressure than the surrounding air which is thought to be the result of carbohydrate respiration within the unripe fruits. The inclosed gas, which may arise largely from certain tissues in some species and from different tissues of the fruit in other species, has a higher CO₂ content than the outside air. It is suggested that the biologic rôle of the inclosed atmosphere is to supply a moist medium around the developing seeds and also to aid in the development of a structure which will make wind dissemination of the fruit possible. A bibliography is given.—W. C. Muenscher.

1527. CROCKER, WILLIAM. Respiration of stored wheat. [Rev. of: BAILEY, C. H., AND A. M. GURJAR. Respiration of stored wheat. Jour. Agric. Res. 12: 685-713. 1918.] Bot. Gaz. 67: 180. 1919.

1528. HAAS, A. R. C. Respiration after death. Bot. Gaz. 67: 347-365. 3 fig. 1919.—The author reports the results of a study of the respiration of *Laminaria* after mechanical injury and after being killed by alcohol, acetone, formaldehyde, and ethyl bromide. The output of CO₂ was estimated by determining the increase in hydrogen ion concentration, following wounding or death. The method used was that of comparing the color produced when phenolsulphon phthalein was added to the solution to be tested with the colors of a series of buffer mixtures containing an equal amount of the same indicator. The author concludes from his results that the respiration of *Laminaria* after death may be considerably greater than in its normal condition.—D. H. Rose.

1529. HAAS, A. R. C. Effect of anesthetics upon respiration. Bot. Gaz. 67: 377-404. 7 fig. 1919.—When *Laminaria* is exposed to anesthetics in sufficiently high concentration to

produce any result, the initial effect is an increase of respiration. This may be followed by a decrease if the anesthetic is sufficiently toxic. No decrease of respiration is observed when the concentration is too low to be toxic. These results directly contradict the idea advocated by Verworn and his pupils that anesthetics act by decreasing respiration.—A. R. C. Haas.

1530. HARRINGTON, G. T. Respiration and age of plant organs. [Rev. of: NICOLAS, G. Contribution à l'étude des variations de la respiration des végétaux avec l'âge. Rev. Gen. Bot. 30: 214-225. 1918.] Bot. Gaz. 67: 177-179. 1919.

1531. HERRMANN. Die Keimungsenergie des Kieferssamens in Theorie und Praxis. [Germination-energy of pine seeds in theory and practice.] Naturw. Zeitschr. Forst- u. Landw. 17: 53-57. Pl. 1-2. 1919.—See Bot. Absts. 3, Entry 2026.

ORGANISM AS A WHOLE

1532. ALLEN, E. R. Some conditions affecting the growth and activities of *Azotobacter chroococcum*. Ann. Missouri Bot. Gard. 6: 1-44. Pl. 1, fig. 1-2. 1919.—Allen reports experimental data which suggest that "some of the markedly beneficial results observed in cultural solutions" by previous workers are related to phosphorus nutrition of the organism and to maintenance of the proper reaction of the medium. Experiments on the removal and restoration of the solid phase of those culture media which produce a precipitate and on the use of media which form no precipitate, as well as those with agar as a protective colloid, are suggestive; but the author feels that they give no final proof of the mechanism of the increase in growth of *Azotobacter chroococcum*. The beneficial effect of the agar might be explained by the presence of certain nutrients in the agar but this seems less plausible than to consider the agar as a protective colloid. One of the many difficulties which stands in the way of the proper development of this line of investigation is the interference of colloids. When colloidal hydrated ferric oxide is used in culture media duplicate results do not check and it is thus difficult to duplicate the work of another investigator where colloids are used. The method of measuring growth for a short incubation period proved to be the only reliable method to be used when dealing with *Azotobacter*, but wholly inadequate to permit a rigid examination of the influence of different conditions. Bonazzi's method of repeatedly renewing the energy supply and measuring the products of growth of nitrite-producing bacteria is far superior but not applicable to *Azotobacter* cultures. Since the presence of phosphates and the absence of an acid reaction are known requirements of the culture medium they should be studied in detail before further speculative theories are advanced.—S. M. Zeller.

1533. BAUD, PAUL. Les nouveaux modes d'emploi des Mucédinées dans les industries agricoles. [New modes of employing molds in the agricultural industries.] Chimie et Industrie 1919⁷. 9 p. 1 fig. 1919.

1534. BRIERLY, W. B. Some concepts in mycology—an attempt at synthesis. Trans. British Mycol. Soc. 6: 204-235. 1919.—See Bot. Absts. 4, Entry 1061.

1535. BROWN, W. H. Vegetation of Philippine mountains. The relation between the environment and physical types at different altitudes. Philippine Bur. Sci. Publ. 13. 434 p. Pl. 1-41, fig. 1-30. 1919.—See Bot. Absts. 4, Entry 180.

1536. CHURCH, A. H. The plankton-phase and plankton-rate. Jour. Bot. Suppl. III. 8 p. 1919.—See Bot. Absts. 4, Entry 182.

1537. FEILLITZEN, H. VON. Cultural experiments on moor lands. Jour. Amer. Peat Soc. 12: 216-217. 1919.—See Bot. Absts. 4, Entry 64.

1538. HENDERSON, WILLIAM F. Some experiments conducted with pure cultures of bread yeast. Trans. Amer. Microsc. Soc. 38: 221-227. Pl. 23, 24. 1919.—See Bot. Absts. 4, Entry 1108.

1539. HUNTER, ALBERT C., AND CHARLES THOM. An aerobic, spore forming bacillus in canned salmon. Jour. Franklin Inst. 188: 136. 1919.

1540. MACDOUGAL, D. T., H. M. RICHARDS, AND H. A. SPOEHR. Basis of succulence in plants. Bot. Gaz. 67: 405-416. 1919.—See Bot. Absts. 4, Entry 244.

1541. MONDINO, ALFONSINO. Ricerche anatomiche e morfologiche sulla var. "tuberosa" Asch. dell "*Arrhenatherum elatius*" M. K. nuovamente trovata in Piemonte. [Anatomical and morphological investigation of var. tuberosa Asch. of *Arrhenatherum elatius* M. K. recently found in Piedmont.] Atti. R. Accad. Sci. Torino 54: 782-794. 1919.—See Bot. Absts. 4, Entry 988.

1542. MOREAU, F. M., AND MME. F. MOREAU. Recherches sur les lichens de la famille Peltigeracees. [Researches on the lichens of the family Peltigeraceae.] Ann. Sci. Nat. Bot. X. 1: 29-32. 1919.—See Bot. Absts. 4, Entry 1130.

1543. [NORDSTEDT, C. F. O.] [Swedish rev. of: MURBECK, Sv. Beiträge zur Biologie der Wüstenpflanzen. [Contribution to our knowledge of the biology of desert plants.] Lunds Univ. Arsskr. 14: 36. 1919.] Bot. Notiser 1919: 166. 1919.

1544. PETERSEN, HENNING E. Maglemose i Grib Skov. Undersogelser over Vegetationen paa en nords jaellandsk Mose. [High moors in the woods of Gribs Skov. Investigation of the vegetation of a northern moor.] Bot. Tidsskr. 36: 57-154. Pl. 1-17, fig. 1-18. 1917.

1545. PRINGSHEIM, ERNST G. Die Kultur der Desmidiaceen. [The culture of Desmidiaceae.] Ber. Deutsch. Bot. Ges. 36: 482-485. 1918.—Twelve species of Desmidiaceae and four species of Mesotaeniaceae were obtained in pure culture from fresh material and grown on silica jelly which had been flooded with a nutrient solution of a 0.1 per cent KNO_3 , 0.02 per cent K_2HPO_4 , .02 per cent MgSO_4 . For liquid cultures, soil decoctions were used first and later nutrient media. The purity of the distilled water is a factor of great importance if successful results are to be obtained. The reaction of the medium must be neutral or slightly basic; the concentrations of the solution must not be high. KNO_3 or $\text{Ca}(\text{NO}_3)_2$ in 0.1 per cent solution is the maximum for best growth. Ammonium salts are less suited. Best growth was obtained with calcium nitrate as a source of nitrogen. Leaving calcium out of the nutrient medium had no visible effect because enough of the metal is obtained from the glass containers. *Mesotaenium*, however, grew very poorly in the absence of calcium.—Ernst Artschwager.

1546. ROSE, D. H. Blister canker of apple trees; a physiological and chemical study. Bot. Gaz. 67: 105-146. 1919.—The author finds that apple bark attacked by *Nummularia discreta* has about twice the oxidase activity of healthy bark. Measurements were made with the simplified Bunnell apparatus. Oxidation in the apparatus comes to an end only after several days instead of after a few hours, as stated by Bunnell. This gradual slowing down is shown to be due, in part at least, to increasing hydrogen ion concentration, brought about by the oxidation process itself. The equilibrium reached seems to be a false one, which can be disturbed by the addition of either fresh oxidase reagent or fresh plant material. When tested by the formula for a monomolecular reaction the oxidation figures give fairly constant values for k , thus indicating a linear relation between time and amount of change. Results for catalase determinations are said to show some discrepancies, but justify the general statement that the more severely the bark is attacked by the fungus the greater is its catalase activity. Tests with the fungus in pure culture show that it possesses both oxidase and catalase activity. Macro-chemical tests show that diseased bark has a higher percentage of dry matter, lipoids, alcohol-water-insoluble residue and total nitrogen, but a lower percentage of alcohol-water-soluble material than healthy bark. The percentage of carbohydrates in both tissues seems to be about the same. The tannin content of diseased bark was slightly less than that of healthy bark. The greater oxidase activity of diseased bark is thought by the author to be due to the combined activity of the oxidase of fungus and host to lower acidity (P_H 5.61 for diseased bark, and P_H 5.15 for healthy bark) and possibly to a greater degree of dispersion of the oxidizing agent.—D. H. Rose.

1547. STONE, A. L. Testing of newly harvested field seed is difficult problem. Seed World 5¹⁰: 37. 1919.—See Bot. Absts. 4, Entry 129.

1548. SUMNER, F. B. Adaptation and the problem of organic purposefulness. II. Amer. Nat. 53: 338-369. 1919.—See Bot. Absts. 3, Entries 2202, 2518.

1549. WALDRON, RALPH AUGUSTUS. The peanut (*Arachis hypogaea*) its history, histology, physiology, and utility. Contrib. Bot. Lab. Univ. Pennsylvania 4: 301-338. Pl. 79-80. 1919.—See Bot. Absts. 4, Entry 139.

1550. WATERMAN, W. G. Development of root systems under dune conditions. Bot. Gaz. 68: 22-53. 17 fig. 1919.

1551. WOLF, CHARLES G. L. Contributions to the biochemistry of pathogenic anaerobes. VII. The biochemistry of *Bacillus proteus*. Jour. Path. and Bact. 22: 289-307. 1919.—*Bacillus proteus* grown under various media (peptone, glucose peptone, milk, cooked meat, sterile urine) does not exhibit the qualities of a putrefactive organism. Compared with *B. sporogenes* and *B. histolyticus* its proteolytic activities are not great. As a gas former, its action is moderate. The volatile acid production is small. The two strains of the organism studied attacked lactose. The presence of an active urease capable of transforming 45 per cent of the total nitrogen of urine into ammonia was demonstrated. No indol was found under the most favorable conditions for its development.—W. W. Bonns.

GROWTH, DEVELOPMENT, AND REPRODUCTION

1552. CHANDLER, W. H. Pruning—its effect on production. Trans. Indiana Hortic. Soc. 1918: 137-145, 156-161. 1919.—See Bot. Absts. 4, Entry 908.

1553. CROCKER, WILLIAM. Conditions affecting flower development. [Rev. of: (1) KLEBS, GEORGE. Ueber die Blütenbildung von *Sempervivum*. Festschrift zum Ernst Stahl. P. 138-151. Jena, 1918. (2) FISCHER, H. Zur Frage der Kohlensäure-Ernährung der Pflanzen. Gartenflora 65: 232-237. 1916. (3) KRAUS, E. J., AND H. R. KRAYBILL. Vegetation and reproduction with special reference to the tomato. Oregon Agric. Exp. Sta. Bull. 149. 90 p. 1918.] Bot. Gaz. 67: 445-446. May, 1919.—“These papers have thrown much light on some of the nutrient factors modifying vegetation and reproduction in plants. The contribution of Kraus and Kraybill apparently puts into the hands of producers one of the important means of controlling fruitfulness. Fischer’s less extensive and one-sided attack caused him to miss the fact that a very high C/N not only reduces vegetative growth but diminishes reproduction.” [See Bot. Absts. 1, Entry 1402; 2, Entry 601.]—H. C. Cowles.

1554. CROCKER, WILLIAM. Wound callus and bacterial tumor. [Rev. of: MAGNUS, WERNER. Wund-Callus and Bakterien-Tumore. Ber. Deutsch. Bot. Ges. 36: 20-29. 1918 (See Bot. Absts. 2, Entry 610).] Bot. Gaz. 67: 516-517. 1919.

1555. ENSIGN, M. R. Venation and senescence of polembryonic citrus plants. Amer. Jour. Bot. 6: 311-329. 6 fig. 1919.—It is known that in polyembryonic seeds of *Citrus* one of the embryos is gametic and the others apogamous. Hence a study of the comparative size of vein-islets in the leaves of a pair of seedlings produced from a single seed may afford evidence of the dependence of rejuvenescence on sexual reproduction. Germination tests show that 43 per cent of the seeds of *Citrus grandis* produce more than one hypocotyl. The size of the vein-islet is constant for all parts of a given leaf; it increases slightly as the leaf matures; in mature leaves it is the same in healthy and chlorotic plants, and in large and small leaves; finally, it is identical in the mature leaves of two seedlings produced from a polyembryonic seed. The nucleo-cytoplasmic ratio, which has been thought to be a criterion of cell-age, is essentially the same in the root meristems of gametic and apogamous plants. Differences in vigor in members of a pair of seedlings are due to differences in cotyledon-size rather

than to differences in degree of senescence. The explanation of these results may be that the parent plant was not old enough to show measurable senescence compared to its rejuvenated offspring; that the venation character is not correlated with age in this species; or that rejuvenescence is not a function of sexual reproduction. The author inclines to the latter interpretation, holding that the "undifferentiation" which is the essential feature of rejuvenescence occurs in the reduction of the organism to a unicellular embryo, and is independent of the stimulus, sexual or otherwise, which initiates growth.—A new method for clearing and staining leaves is described.—*G. S. Torrey.*

1556. FINDEIS, MARIE. Über das Wachstum des Embryos im ausgesäten Samen vor der Keimung. [On the growth of the embryos in sown seeds before germination.] Sitzungsber. K. Akad. Wiss. Wien (Math.-Nat. Kl.) 126: 77-102. 2 pl. 1917.—See Bot. Absts. 4, Entry 987.

1557. GERTZ, OTTO. Panachering hos *Mercurialis perennis* L. En morfologisk, anatomisk och mikrokemisk studie. [Variegation in *Mercurialis perennis* L.] [Swedish, with German résumé.] Bot. Notiser 1919: 153-164. Fig. 1-23. 1919.—The studies were carried out in the Beechwoods of Torup, Skåne, Sweden, from 1907 to 1917. The partly chlorophyll-free leaves were confined to specimens growing in a very restricted area, and it seemed as if these specimens had developed by budding from the rootstock of one original mother-plant, though a few normal specimens were growing in the clump. The variegation consisted sometimes in a chlorophyll-free marginal zone, 2 mm. wide of variable length, sometimes in larger or smaller white blotches. The epidermal cells were much larger in the normally developed portion of the leaves, the ratio being on the upper side 2.6:1 and on the lower side 2.7:1. The shape of the cells was often changed, and the cell-walls, normally very sinuate, often became straight in the white fields, especially in the region of tension between the different colored fields. The stomata, which are found on the lower surface, were often irregular or only partly developed in the white fields. There were also differences in the thickness of the blades, the normally developed fields being thicker, the ratio being 1.5:1 up to 2.1:1. The palisade cells on the upper surface had become depressed in the white fields and more like the epidermal cells. The parenchyma-cells and the vessels showed also some differences. The white fields lacked as a rule starch, except in the cells of the stomata. In cultures of chlorophyll-free pieces in glucose-solution, starch was formed, however. The white fields contained less albumen. *Mercurialis perennis* gives excellent material for studies of Molisch's "kalium-karotin" reactions. Reference literature, 7 articles. [See Bot. Absts. 3, Entry 2126].—*P. A. Rydberg.*

1558. HART, E. B., AND H. STEENBOCK. Maintenance and reproduction with grains and grain products as the sole dietary. Jour. Biol. Chem. 39: 209-233. Charts 1-13. 1919.—Grains and their products used as the sole articles of diet proved insufficient for maintenance (growth was not experimented on) and reproduction in the animal experimented on. Broad generalizations must not be made from experiments on a few species.—*G. B. Rigg.*

1559. ILLICK, J. S. When trees grow. Amer. Forest. 25: 1386-1390. 9 fig. 1919.—See Bot. Absts. 4, Entry 437.

1560. MACDOUGAL, D. T. Growth in organisms. Science 49: 599-605. 1919.—In this address, delivered before the Pacific Division of the American Association for the Advancement of Science, at Pasadena, June 19, 1919, the writer considers the subject according to the following brief: (1) The development of an organism from the spore or embryonic stage includes the processes of auxesis or enlargement and of differentiation. (2) Living matter is conceived to be composed mainly of pentosans and albumins or albumin derivatives. (3) The principal and characteristic substances of the two groups are practically non diffusible, and hence come together only as an intimate mixture in a colloidal condition. (4) Growth of living matter consists of hydration with accompanying swelling and of accretion of solid matter. (5) The hydration of the substances belonging to the two main components is affected in an opposite manner by hydrogen ions, and is variously modified by temperature and

other conditions. (6) Accretions of new material include the absorption of salts which tend to restrict hydration and the incorporation of amino-compounds. So-called nutrient salts do not constitute food but may act as catalysts or releasers of energy in other substances and as controls. (7) The enlargement of cells is almost entirely by the swelling which results from hydration in their earlier stages, and later the enlargement of the syneretic cavities in the colloidal structure is followed by the distending or stretching action of osmotic pressures in the vacuoles thus formed. (8) Illustrations are afforded by records of growth of leafy stems, joints of cacti, fruits of *Solanum*, and trunks of trees.—A. H. Chivers.

1561. MOLISCH, HANS. Über das Treiben von Wurzeln. [Forcing of roots.] Sitzungsber. K. Akad. Wiss. Wien (Math.-Nat. Kl.) 126: 3-12. Pl. 1-2, fig. 1-4. 1917.—The author used freshly cut three year old twigs of *Salix*, *Populus*, *Philadelphus coronarius*, and *Viburnum opulus*. Adventitious roots were freely formed by these branches after their leaf and flower buds were forced by exposure to tobacco or paper smoke or a warm water bath in late autumn.—W. C. Muenscher.

1562. NAGAI, ISABURO. The correlation in the differentiation of sex in the fern prothallia. Bot. Mag. Tokyo 33: 157-170. 1919.—A continuation of the author's studies of the effect of light and nutrient media on the development of sex organs in ferns. Spores were sowed on 0.25 per cent, 0.5 per cent, and 1 per cent Knop's solution and grown in good light and in weak light. Cultures in weak solutions and weaker light produce antheridia but no archegonia. Better light and stronger media induce the formation of an apical meristem followed by the development of archegonia. Though the prothallia of *Blechnum nipponicum* are monoecious in nature, they are strongly dioecious in these cultures. The author argues that the evidence indicates the presence in each protoplast of a determiner for antheridia and one for apical meristem and archegonia, one of which is prevented from functioning by an inhibitor.—Leonas I. Burlingame.

1563. ZELLER, S. M., H. SCHMITZ, AND B. M. DUGGAR. Studies in the physiology of the fungi VII. Growth of wood-destroying fungi on liquid media. Ann. Missouri Bot. Gard. 6: 137-142. 1919.—Experiments undertaken to determine (1) which wood-destroying fungi are adapted to growth on liquid media, (2) what liquid media are suitable for their growth, and (3) the influence of the hydrogen ion concentration of the media indicate that (1) many wood-destroying fungi are not suitable for growth experiments with liquid media; (2) there is a decided indication of the desirability of selecting a specific medium for each fungus; and (3) that the H-ion concentration does not seem to be the only limiting factor in growth.—S. M. Zeller.

MOVEMENTS OF GROWTH AND TURGOR CHANGES

1564. CROCKER, WILLIAM. Turgor movements. [Rev. of: BLACKMAN, V. H., AND S. G. PAINE. Studies in the permeability of the pulvinus of *Mimosa pudica*. Ann. Botany 32: 69-85. 1918 (See Bot. Absts. 1, Entry 175).] Bot. Gaz. 67: 278. 1919.

1565. CROCKER, WILLIAM. Phototropism. [Rev. of: PARR, ROSALIE. Response of *Pilobolus* to light. Ann. Botany 32: 177-205. 1918.] Bot. Gaz. 67: 272-273. 1919.—The author is strongly commended for an excellent piece of quantitative work in a field in which such work has been largely absent. [See Bot. Absts. 1, Entry 1656].—H. C. Cowles.

1566. CROCKER, WILLIAM. Geotropism and phototropism. [Rev. of: VAN AMEIJDEN, U. P. Geotropism and phototropism in the absence of free oxygen. Recueil Trav. Bot. Néerland. 14: 149-218. 1917. Pl. 15-16, fig. 1.] Bot. Gaz. 67: 184. 1919.

1567. CROCKER, WILLIAM. Statolith starch. [Rev. of: ZOLLIKOFER, CLARA. Über das geotropische Verhalten entstärkter Keimpflanzen und den Abbau der Stärke in Gramineenkoleoptilen. Ber. Deutsch. Bot. Ges. 36: 30-38. 1918 (See Bot. Absts. 2, Entry 607).] Bot. Gaz. 67: 520. 1919.

1568. NIENBURG, WILHELM. Über phototropische Krümmungen an langsseitig zum Teil verdunkelten Avena-Koleoptilen. [Phototropic curvature of the coleoptile of *Avena* which was subjected to partial lateral shading.] Ber. Deutsch. Bot. Ges. 36: 491-500. 1919.—Experiments carried on with *Avena* seedlings support the view of Darwin that phototropic reactions are dependent on sensitiveness to differences of illumination and not on the direction of the light source. In agreement with the observations of Blaauw, the mechanism of the curvature is to be sought in a decreased growth on the side exposed to the light.—*Ernst Artschwager*.

1569. SHULL, C. A. Orientation of roots. [Rev. of: HOLMAN, RICHARD M. (1) The orientation of primary terrestrial roots with particular reference to the medium in which they are grown. (2) Influence of the medium upon the orientation of secondary terrestrial roots. Amer. Jour. Bot. 3: 274-318, 407-414. 1916.] Bot. Gaz. 67: 376. 1919.

1570. STARK, P. Das resultanten Gesetz beim Haptotropismus. [The resultant law in haptotropism.] Jahrb. Wiss. Bot. 58: 475-523. 22 fig. 1919.—The experiments were carried on with seedlings of *Avena sativa*, *Hordeum vulgare*, and *Agrostemma Githago*. It was found that in case a single flank was sensitized the degree of response was in direct proportion to the amount of stimulus applied. If two flanks were sensitized equally strong, the curvature was in the direction of the bisector of the angle, but the greater the angle between the two flanks, the less definite was the response and the greater was the deviation from the mean. Increasing the size of the angle and at the same time increasing the stimulus resulted in the same percentage of curvature, but the differences in the deviation from the mean remained the same. Keeping the angle between the two flanks constant and increasing the amount of stimulus results in an increase in the percentage of curvatures and in a decrease in the deviation from the mean of the bisector of the angle. If the two flanks are unequally stimulated, the angle of curvature will be determined by the parallelogram of forces. The deviation from the mean is usually below the value of 1° , at most 1.9° . The same is true if three or four flanks are sensitized equally or unequally. The deviation from the mean is usually below 1° . However, this does not always hold true. Sometimes it happens that the curvature takes place in the direction of the greater sensitized flank.—*E. F. Artschwager*.

GERMINATION, RENEWAL OF ACTIVITY

1571. CROCKER, WILLIAM. Secondary dormancy in seeds. [Rev. of: KIDD, F., AND C. WEST. The controlling influence of carbon dioxide. The production of secondary dormancy in seeds of *Brassica alba* following treatment with carbon dioxide and the relation of this phenomenon to the question of stimuli in growth phenomena. Ann. Botany 31: 457-487. 1917.] Bot. Gaz. 67: 269-270. 1919.

1572. CROCKER, WILLIAM. Light and germination. [Rev. of: LEHMANN, ERNST. Über die minimal Belichtungszeit welche die Keimung der Samen von *Lythrum Salicaria* auslöst. Ber. Deutsch. Bot. Ges. 36: 157-163. 1918 (See Bot. Absts. 2, Entry 611).] Bot. Gaz. 67: 520. 1919.

1573. KING, CHARLOTTE M. "Time and season" among the trees. Rept. Iowa State Hortic. Soc. 53: 416-417, 1918.—A brief discussion of rest period and of phemologic data on trees.—*L. H. Pammel*.

1574. ROSE, R. C. After-ripening and germination of seeds of *Tilia*, *Sambucus* and *Rubus*. Bot. Gaz. 67: 281-309. 1919.—Air-dry seeds of *Tilia americana*, *Sambucus canadensis* and *Rubus Idaeus* do not germinate when placed on a moist substratum at room temperature. In no case does water-absorption seem to be the limiting factor. Air-dry seeds planted in the soil over winter gave low percentage of germination. The author states that for *Tilia*, dormancy is not due to the seed-coats but to an actually dormant endosperm or embryo or both. Seeds after-ripened at temperatures slightly above freezing germinate readily at 10°

to 12°C., but very poorly at room temperature. The hydrogen-ion concentration was found to increase as after-ripening progressed. For *Sambucus* the highest germination (77 per cent) was obtained by layering fresh seeds out-of-doors over winter. No satisfactory forcing agent was found. Drying probably injures the seeds somewhat but is not the only cause for their poor germination. What other cause or causes there may be the author has not been able to determine. Dormancy in *Rubus* is thought to be due to the high breaking strength of the endocarp. Ready germination was obtained with seeds that had been treated with concentrated H_2SO_4 for two hours, rinsed in an excess of cold water, the remaining acid neutralized with sodium bicarbonate and the seeds rinsed again with water.—D. H. Rose.

1575. WEBB, R. W. Studies in the physiology of the fungi X. Germination of the spores of certain fungi in relation to hydrogen ion concentration. Ann. Missouri Bot. Gard. 6: 201-222. Fig. 1-5. 1919.—Spores of *Aspergillus niger*, *Penicillium cyclopium*, *Fusarium* sp., *Botrytis cinerea*, and *Lenzites saepiaria* were germinated in solutions of M/5 mannite which were adjusted to various P_H values by use of ortho-phosphoric acid and sodium hydroxide solutions. For all of the fungi studied, with the possible exception of *Fusarium*, the optimum active acidity for germination was on the acid side of neutrality, inhibition being evidenced at or above P_H 2.8. Hydroxyl ions appear to be relatively more toxic than hydrogen ions.—S. M. Zeller.

REGENERATION

1576. COULTER, J. M. Regeneration in *Phegopteris*. [Rev. of: BROWN, ELIZABETH W. Regeneration in *Phegopteris polypodioides*. Bull. Torr. Bot. Club 45: 391-397. 3 fig. 1918 (See Bot. Absts. 2, Entry 737).] Bot. Gaz. 67: 183. 1919.

1577. MASSART, JEAN. Sur la polarité des organes végétaux. [On the polarity of plant organs.] Bull. Biol. France et Belgique 101: 475-483. 8 fig. 1918.—The author gives results obtained from experiments made upon polarity dealing with 30 different species of plants. He concludes that there is no uniformity in the polarity of stems; that branches are more sharply localized than roots; that root polarity determines not only the point of origin of new roots, but also provides for the absorption of liquids at the proximal end and the transmission of these liquids toward the distal end; and that the loss of root polarity is correlated with the habit of the plant. Further experiments were conducted to ascertain the effect of various external stimuli upon polarity. These were so controlled that opposing factors, such as light and darkness, dryness and humidity, etc., were forced to exert their influence in different combinations. Three species were employed, and six different combinations were arranged for each species. The results obtained are indicated diagrammatically.—P. D. Strausbaugh.

1578. TAYLOR, WILLIAM RANDOLPH. On the production of new cell formations in plants. Contrib. Bot. Lab. Univ. Pennsylvania 4: 271-299. Pl. 71-78. 1919.—See Bot. Absts. 3, Entry 2450.

TEMPERATURE RELATIONS

1579. ÅKERMANN, Å. Vaxternäs köld-död och frost-härdighet. [Winter killing and frost-resistance of plants.] Sver. Utsadesf. Tidskr. 29: 61-85. 1919.—This is a discussion of the more practical aspects of the problem of tissue injury and death due to low temperature. Previous work is reviewed. Experiments are described bearing on the temperature curve of freezing tissue, on the effect of rapid thawing, on the effect of previous exposure to high or low temperatures, and on the relation of killing temperature to carbohydrate content. Constant low temperatures are maintained with the aid of carbohydrates. Results of sugar determinations of different varieties of winter wheat show that the more resistant varieties have a higher sugar content. The practicability of the use of relative sugar content as an index of probable winter resistance in breeding for winter resistance in cereals is also discussed.—E. G. Anderson.

1580. ANONYMOUS. Measuring the temperature of leaves. *Sci. Amer.* 120: 365. 1919.

1581. BRUETT, E. M. Utility of blanching in food canning; effect of cold shock upon bacterial death rates. *Jour. Indust. Eng. Chem.* 11: 37-39. 1919.—No evidence is found that heat and cold shock increase the susceptibility of bacterial spores to heat, for the death rates of such bacteria are not increased during a second heating beyond the death rates of "unshocked" bacteria subjected to the same temperature.—*H. Schmitz.*

1582. BURGESS, J. L. Relation of varying degrees of heat to the viability of seeds. *Bull. North Carolina Dept. Agric.* 40⁶: 9-11. 1919.—Record of experiments with seeds of garden beans, cowpeas, soybeans, corn, oats, rye, and wheat, exposed at varying temperatures for varying lengths of time to test influence on viability.—*F. A. Wolf.*

1583. CHANDLER, W. H. The effect of cold winter of 1917-18 on the fruit industry. *Trans. Indiana Hortic. Soc.* 1918: 91-103. 1 *pl.* 1919.—See Bot. Absts. 4, Entry 908.

1584. CHILD, C. M., AND A. W. BELLAMY. Physiological isolation by low temperature in *Bryophyllum* and other plants. *Science* 50: 362-365. 1919.—It has long been known that in axiate plants a physiologically active growing tip more or less completely inhibits the development of other growing tips or axes of the same plant. As regards the manner in which such an effect of one part upon another may be produced, there are three possibilities: first, the growing tip may inhibit by obtaining the greater proportion of nutritive material; second, the inhibiting part may produce substances which are transported by the fluids of the plant to other parts; and third, the activity of the inhibiting part may produce dynamic changes which are conducted through the protoplasm and influence the physiological condition of other parts. Serious objections to the first two explanations are cited. Extensive experiments have been performed by the authors on *Bryophyllum*, *Phaseolus multiflorus*, *Phaseolus macrocarpus*, and *Saxifraga sarmentosa*. In these experiments low temperature was used as a block to the action of the growing tip upon other parts of the plants. In *Bryophyllum* when a length of 2 to 3 cm. of the petiole is kept at a temperature of 2.5° to 3°, and the leaf immersed in water, the notches will develop into plants. In experiments on varieties of beans, the buds in the axils of the cotyledons could be induced to develop when a length of 2 to 3 cm. of the stem above the cotyledons was inclosed in the coil at 3°, 4° or even 5°C. It appears at least highly probable that the inhibiting action of growing tip, leaf, or other active region depends for its passage from point to point upon metabolically active protoplasm, rather than upon purely physical transportation through preformed channels.—*A. H. Chivers.*

1585. GREENE, LAURENZ. 1917-1918 winter injury to apple trees. *Rept. Iowa State Hortic. Soc.* 53: 119-124. 2 *pl.* 1918.—See Bot. Absts. 4, Entry 926.

1586. HIBBARD, R. P. Temperature and crops. [Rev. of: SEELY, D. A. (1) Relation between temperature and crops. *Monthly Weather Rev.* 45: 354-359. 1917. (2) The length of the growing season in Michigan. *Michigan Acad. Sci. Rept.* 20: 223-232. *Fig. 22-25.* 1918.] *Plant World* 21: 329-330. 1918.

1587. JOHNSTON, EARL S. An index of hardiness in peach buds. *Amer. Jour. Bot.* 6: 373-379. *Fig. 1-2.* 1919.—In attempting to find a criterion for determining the degree of hardiness in the peach, the author has studied the moisture content in the fruit buds of two varieties, the Elberta and the Greenboro, during the winter and early spring. He notes a marked increase in water content in both varieties beginning about February 1, a condition which he believes is related to the fact that peach fruit buds are always very "tender" in early spring. No important differences were noted between trees receiving various fertilizer treatments or between those on high ground and those on low ground. The water content of Elberta buds is consistently higher than that of Greensboro and this difference increases as the season advances. Since the Elberta is considered less hardy than the Greensboro, these facts are believed by the author to be significant as indicating that low water content is associated with increased hardiness.—*E. W. Sinnott.*

1588. JONES, L. R., AND H. H. MCKINNEY. The influence of soil temperature on potato scab. *Phytopath.* 9: 301-302. 1919.—See Bot. Absts. 4, Entry 1308.

1589. LIVINGSTON, B. E. Frost injury. [Rev. of: HARVEY, R. B. Hardening process in plants and development from frost injury. *Jour. Agric. Res.* 15: 83-111. *Pl.* 7-11, and A, 3 fig. 1918.] *Plant World* 21: 299-300. 1918.

1590. PAMMEL, L. H. Effect of winter on shrubs at Ames, Iowa. Rept. Iowa State Hortic. Soc. 53: 39-41. 1918.—See Bot. Absts. 4, Entry 868.

1591. STEVENS, NEIL E., AND C. H. HIGGINS. Temperature in relation to quality of sweet corn. *Jour. Agric. Res.* 17: 275-284. 1 fig. 1919.—The conclusions of Appleman and Arthur (*Jour. Agric. Res.* 17: 137-152. 1919) that the rate of loss of sugar in picked sweet-corn increases with a rise in temperature are confirmed. A different variety, Early Bantam, was used.—The rate of respiration of picked corn also varies with temperature, being greater at higher temperatures, at least up to 30°.—The temperature of green corn on the stalk is near that of the air, if shaded, and higher if in the sun.—The average temperature of the corn picking season in Maryland (August) is much higher than the corresponding season in Maine (September) and this difference is sufficient to allow considerably greater deterioration in picked corn in Maryland during a given period. Under identical conditions of practice corn preserved in Maine (north) would be superior (sweeter) to that canned in Maryland (south).—D. Reddick.

1592. VASS, A. F. The influence of low temperature on soil bacteria. Cornell Univ. Agric. Exp. Sta. Mem. 27: 1039-1074. 1919.—Using field soils, a study is made of the effect of the rate of thawing, alternate freezing and thawing, and the length of time frozen on the number of soil bacteria as shown by the agar plate. The increased count in frozen soils is attributed to a breaking up of the clumps of bacteria. *Bacillus radiculicola* in soil culture does not seem to be affected by freezing. In nutrient solutions concentrations of dextrose and glycerin of one per cent and above exert a protective influence against low temperature. [See Bot. Absts. 4, Entry 1648.]—W. H. Chambers.

1593. WALDRON, C. B. Factors in hardiness. Rept. Iowa State Hortic. Soc. 53: 115-119. 1918.—Summarizing his discussion the author says: "Hardiness then, as we use the term, is a quality so fundamentally inherent in plants as to be modified little or not at all by selection over reasonable periods of time." Early maturity is another factor. Winter killing is frequently caused by sudden freezing of roots not fully matured. More attention should be given to the origin of plants. In breeding, one of the plants should be of known hardiness.—L. H. Pammel.

RADIANT ENERGY RELATIONS

1594. ANONYMOUS. How plants and animals utilize color. Pigments that protect living matter against radiation. *Sci. Amer. Suppl.* 87: 102. 1919.—A review of the more recent literature, with bibliography.—Chas. H. Otis.

1595. COULTER, J. M. The luminous moss. [Rev. of: YASUMOCHI, TODA. Physiological studies on *Schistostega osmundacea* (Dicks) Mohr. *Jour. Coll. Sci. Tokyo* 40: No. 5. 30 p. 2 pl. 1918.] *Bot. Gaz.* 67: 278-279. 1919.—See Bot. Absts. 1, Entry 739.

1596. DE BESTERIO, DOLORES C., AND MICHEL-DURAND. Influence de la lumiere sur l'absorption des matieres organiques du sol par les plantes. [Influence of light on absorption of organic compounds.] *Compt. Rend. Acad. Sci. Paris* 168: 467-470. 1919.—Plants of *Pisum sativum* were grown in cultures on Knop's solution, to which 4 parts glucose per 1000 were added, the roots developed under aseptic conditions, the tops being free in the air. Cultures were exposed to light intensities corresponding to $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ and complete sunlight. The dry weights of the entire plants, as well as the roots, increased with the light intensity. The

amount of glucose absorbed from the solutions was greatest under conditions of greatest illumination. The same weight of roots absorbed more sugar in weak illumination than in strong illumination, but for the whole plant the same weight absorbed practically the same amount of glucose in the various light intensities.—The pea is thus incapable of augmenting the absorbing power of the roots in a manner that would enable it to take up a greater quantity of organic carbon from the soil. No compensation or parallelism exists between the use of CO_2 by the leaves and absorption of organic compounds by the roots.—*F. B. Wann.*

1597. HAMILTON, A. G. The effect of sunlight on plants. *Australian Nat.* 4: 89-90. 1919.—See Bot. Absts. 4, Entry 224.

1598. LAGERBERG, IVAR. Vergleichende Untersuchungen über die Widerstandsfähigkeit der Sporen und der vegetativen Formen einiger sporenbildender Bakterien gegenüber ultraviolett Licht. IV. Mitteilung über die Wirkung der ultravioletten Strahlen. [Comparative studies of the resistance of spores and vegetative forms of spore-forming bacteria to ultra-violet light. IV. On the action of ultra-violet rays.] *Zeitschr. Immunitätsforsch* 28: 186-197. 1919.—Using *Bacillus subtilis*, *B. mesentericus*, *B. megatherium*, and two strains of *B. anthracis*, the effects of ultra-violet light were tested in the usual way. Death occurred sooner when spores and vegetative cells were dry, with little difference between them. Moist spores of *B. anthracis* resisted the rays 8 to 10 times as long as dry spores, but the other bacteria did not show this effect. The vegetative cultures were 6 hours from spores at 36°C. and were tested for the presence of spores by treatment with 3 per cent formaldehyde for 3 minutes or 1 per cent for 10 minutes as the spores of all these species resist this treatment while the vegetative forms do not.—*C. W. Dodge.*

1599. MAST S. O. Reversion in orientation to light in the colonial forms, *Volvox globator* and *Pandorina morum*. *Jour. Exp. Zool.* 27: 367-390. 1919.—(1) *Volvox* and *Pandorina* are usually positive in weak, and negative in strong light if they are dark-adapted; but if they are light-adapted the opposite sometimes holds. (2) If dark-adapted colonies are exposed in constant illumination, they are neutral at first, then they become positive, later negative, and finally positive again. The higher the illumination the shorter the time required to pass through these stages, but in the higher illuminations it requires much more energy to induce the changes in orientation, than it does in the lower illuminations. (3) Reversion is, to a certain extent, dependent upon the amount of energy received, but under certain conditions it appears to be dependent primarily upon the time-rate of change in illumination. (4) Reversion is not controlled by photosynthesis. Red and yellow lights in which photosynthesis is relatively strong have little effect on reversion, while green and blue in which photosynthesis is relatively weak are nearly as effective as white light. (5) The rays which have the greatest stimulating efficiency (green and blue) are the most potent in producing reversion. (6) The sense of orientation is dependent upon the physiological state of the colonies as well as upon the constitution of the culture medium. It is also dependent upon the age of the colonies. Young colonies are more likely to be negative than old ones. (7) Reversion is probably associated with changes in permeability.—*S. O. Mast.*

1600. MAST, S. O. Effect of chemicals on reversion in orientation to light in the colonial form, *Spondylomorom quaternarium*. *Jour. Exp. Zool.* 26: 503-520. 1918.—(1) Acids and some narcotics, especially chloroform, when added to the culture solution, cause negative specimens of *Spondylomorom* to become strongly positive. They have no effect on positive specimens except perhaps to make them more strongly positive. Only a few of the numerous other substances tested have any effect, and these produce only a very slight tendency toward positive orientation. (2) Increase in the concentration of the culture solution, produced by adding culture solution part of which has evaporated, or to which sodium hydrate has been added, causes positive colonies to become strongly negative. Decrease in concentration, produced by adding a less concentrated culture solution, causes negative colonies to become strongly positive. A decrease, produced by adding pure water, has only a very slight effect,

if any. (3) The sense of orientation is not specifically related to the concentration of chemicals in the environment. *Spondylomorom* probably may be either negative or positive in any solution in which it orients at all. The effect of acids on the sense of orientation is probably due to the reduction of hydroxyl ions produced in the culture solution by the acids. (5) Reduction in the concentration of hydroxyl ions, increase in anesthetics, increase in temperature, and decrease in light, produce the same change in the sense of orientation, and this may also occur without any change in the environment. It is, therefore, probably due to some specific change in the physiological process in the organism, which may be induced by a number of different factors. (6) Reversion depends upon the time-rate as well as upon the magnitude of change in the concentration or intensity of the effective factors in the environment.—S. O. Mast.

1601. SCHANZ, FRITZ. Einfluss des Lichtes auf die Gestaltung der Vegetation. [The influence of light on vegetation.] Ber. Deutsch. Bot. Ges. 36: 619-632. 1918.—*Leontopodium alpinum*, the Swiss Edelweiss, when grown at low altitudes loses its dwarf characteristics and develops into a tall plant. Artificial elimination of the ultra-violet rays produces similar effects not only on Edelweiss but also on plants like begonia, lobelia and potato. It appears then that the ultra-violet light retards growth and inhibits elongation and that, broadly speaking, the rays of short wave length are the determining factor in the height development of the vegetation.—Ernst Artschwager.

1602. SHULL, C. A. Photometry. [Rev. of: RIDGWAY, CHARLES S. A promising chemical photometer for plant physiological research. Plant World 21: 234-240. 1918 (See Bot. Absts. 3, Entry 2910).] Bot. Gaz. 68: 71. 1919. "If the instruments and methods of using the solution can be reliably standardized, the inexpensiveness of the materials, ease of taking readings, accuracy of determinations, and its automatic integration for variable conditions of light will make it an excellent instrument for extending our knowledge of the influence of light as related to life processes."—Author's summary.

1603. SUGIURA, K., AND S. R. BENEDICT. The action of radium emanation on the vitamins of yeast. Jour. Biol. Chem. 39: 421-433. 1919.—Growth-promoting factors in yeast may be inactivated partially by means of exposure to radium emanation.—G. B. Rigg.

TOXIC AGENTS

1604. ANONYMOUS. Prejudicial effects of treatment with formalin upon the germination of seeds. Sci. Amer. Supplem. 87: 164. 1919.

1605. CLAYTON, E. E. Hydrogen cyanide fumigation. Bot. Gaz. 67: 483-500. 2 fig. 1919.—Different concentrations of hydrocyanic acid gas gave effects ranging from stimulative to depressive. The maximum of benefit was secured from concentrations deadly to insect life, but just a little below the point of first injury to the plant. Wetting the leaves had a beneficial effect on the tomato. Reduced temperature and low light intensity during the day preceding fumigation increased resistance. Injury closely paralleled the stomatal movement, increasing as the size of stomatal aperture increased. A higher or lower water supply in the soil affected resistance, through hastening or retarding the growth rate. Rapidly growing plants were susceptible to injury, while slow-growing plants were more resistant. High reducing sugar content seemed to be correlated with maximum resistance.—E. E. Clayton.

1606. CROCKER, WILLIAM. Organic plant poisons. [Rev. of: BRENCHLEY, WINIFRED E. Organic plant poisons. I. Hydrocyanic acid. II. Phenols. Ann. Botany 31: 447-456. 1917. Ibid. 32: 259-278. 1918. (See Bot. Absts. 1, Entry 1659).] Bot. Gaz. 67: 182-183. 1919.

1607. CROCKER, WILLIAM. Effect of illuminating gas on plants. [Rev. of: WEHMER, C. Leuchtgaswirkung auf Pflanzen. 4. Die Wirkung des Gases auf das Wurzelsystem von Holzpflanzen; Ursache der Gaswirkung. Ber. Deutsch. Bot. Ges. 36: 140-144. 1918 (See Bot.

Absts. 2, Entry 614).] Bot. Gaz. 67: 517. 1919.—The reviewer notes that "the author seems to have overlooked most of the literature on the effect of illuminating gas on plants."—*H. C. Cowles*.

1608. CROSSLEY, M. L. Gentian violet—Its selective bactericidal action. Jour. Amer. Chem. Soc. 41: 2083–2090. 1919.

1609. DUGGAR, B. M., AND ANNE W. DAVIS. Seed disinfection for pure culture work: the use of hypochlorites. Ann. Missouri Bot. Gard. 6: 159–170. 1919.—Seeds were treated both continuously and discontinuously, with commercial chloride of lime, Javel water, sodium hypochlorite, and Dakin's soluble chlorazene, for various intervals of treatment. After "taking into consideration both (1) the capacity of the seed for germination after treatment and (2) the relative freedom from contamination," "chlorinated potassa," or Javel water, is recommended as the most satisfactory agent. The interval of treatment required for certain seed is 3 hours or more with concentrations of 10 to 20 per cent. Intermittent disinfection is fully warranted in some cases, but the value of soaking the seed before long period treatment is questioned, although a preliminary washing of all seed is advisable.—*S. M. Zeller*.

1610. MCHARGUE, J. S. The effect of manganese on the growth of wheat; a source of manganese for agricultural purposes. Jour. Indust. Eng. Chem. 11: 332–353. 1919.—Manganese in suitable dilution stimulates the growth of wheat, increases the size and nitrogen content of the grain, and evidently performs an important function in the normal growth and development of the plant.—*H. Schmitz*.

1611. STEINBERG, ROBERT AARON. A study of some factors in the chemical stimulation of the growth of *Aspergillus niger*. Amer. Jour. Bot. 6: 330–372. Fig. 1–2. 1919.—*Aspergillus niger* was grown in flasks in Pfeffer's solution, which was modified by changing its acidity, or altering the concentration of the components; or purified by autoclaving with calcium carbonate to remove traces of iron and zinc. The dry weight of mycelium produced in seven days is taken as the yield. Increased acidity of the solution produces an increase in yield and a decrease in the amount of sporulation,—effects similar to those observed upon adding salts of heavy metals, especially iron and zinc. Since the stimulating salts all undergo partial hydrolysis in water, thereby increasing the acidity of the solution, it is possible that the phenomenon is the same in both cases. In purified Pfeffer's solution, practically no growth occurs; slight stimulation results from the addition of either iron or zinc, but both must be present to produce the maximum effect. Stimulation formerly thought to be due to zinc alone is doubtless the effect of both zinc and iron, the latter having been present as an impurity.—*G. S. Torrey*.

1612. STEINKOENIG, L. A. Relation of fluorine in soils, plants, and animals. Jour. Indust. Eng. Chem. 11: 463–465. 1919.—See Bot. Absts. 4, Entries 1636, 2716.

1613. WEHMER, C. Leuchtgaswirkung auf Pflanzen. [Effect of illuminating gas on plants.] Ber. Deutsch. Bot. Ges. 36: 460–464. 1918.—If the roots of young trees are exposed to the gas in late fall, the injury resulting manifests itself in the loss of the foliage of the tree. Later exposures show no direct effect. However, the following spring the treated trees die. The poisoning principle of the gas is hydrogen cyanide which is always present in small quantities. Whenever the HCN was removed by passing the gas through suitable wash bottles, no injury resulted, or the effect was markedly decreased.—*Ernst Artschwager*.

1614. WYETH, F. J. S. The effects of acids, alkalies, and sugars on the growth and indole formation of *Bacillus coli*. Biochem. Jour. 13: 10–24. 1919.—*Bacillus coli* was grown on 2 per cent peptone media, the optimum H-ion concentration of which was found to lie between P_H 4.27 and 9.87. A change in the initial reaction results in a change in the same direction but of less magnitude in the final reaction of the culture. Data on these changes are given. It is noted the formation of indole is retarded by free alkali or acid,—likewise certain sugars cause the same effect by inhibiting the activity of the proteolytic enzymes. Thus 2 per cent glucose to peptone media completely inhibits indole formation, 2 per cent lactose or maltose

almost completely, the same percentage of saccharose or mannite but partially inhibits, and starch has no effect.—A. R. Davis.

1615. YOUNG, H. C. Seed disinfection for pure culture work. *Ann. Missouri Bot. Gard.* 6: 147-158. 1919.—Seeds of various vegetables and cereals were disinfected with calcium hypochlorite, formalin, and mercuric chloride, after preliminary treatment with water, 70 per cent alcohol, or hydrogen peroxide, for various periods of treatment. The results indicate the need of choosing a specific disinfectant and method of treatment for the kind of seed to be sterilized.—S. M. Zeller.

ELECTRICITY AND MECHANICAL AGENTS

1616. MERCIER, C. A. The electrification of seeds. *Sci. Amer.* 120: 142-143. 6 fig. 1919.—See Bot. Absts. 4, Entry 104.

"PHYSIOLOGICAL" DISEASES

1617. BROOKS, CHARLES, J. S. COOLEY, AND D. F. FISHER. Nature and control of apple scald. *Jour. Agric. Res.* 18: 211-240. 1919.—Scald is typically a skin disease of the apple in storage. Only 5 or 6 surface layers of cells are affected, except under long continued unfavorable conditions, when the tissue may become dead, brown, and rot-like to a depth of 1 cm. or even to the core. Well-colored red fruit is practically immune to scald. Losses from scald are greater than from all other transportation and storage diseases of the apple and in addition the trouble introduces uncertainty and misunderstanding in marketing.—The humidity of the storage house does not play a part in the development of scald nor does reduced or increased supply of oxygen, nor ozonated air. Carbon dioxid accumulation does not increase scald and prestorage treatment with this gas for 2 to 6 days reduces the amount of scald development later.—Scald has been produced artificially by subjecting fruits to vapors of ethyl acetate, amyl acetate, and methyl butyrate.—Various esters are formed in the ripening fruit and circulation of air helps to remove these promptly. A large number of fats and oils, which are known to absorb these esters, were tested by impregnating the wrapping paper with them. Many of such treatments proved effective in eliminating or greatly reducing scald. Previously unexplained thermal relations of scald are attributed to greater chemical activity at higher temperatures.—In general, mature fruit scalds less than immature, but fruit just changing from green to yellow scalds worse than either.—Scald is worse on fruit trees receiving heavy irrigation than on those receiving light.—Stirring of storage air is more important than its renewal in preventing scald. Boxed apples exposed to a continuous air current of 0.88 mile per hour have been practically free from scald while similar apples that did not receive the constant fanning became badly scalded.—Apples in ventilated barrels developed less than one-third as much scald as those in commercial barrels when both were held in a storage room that received occasional ventilation; but where the storage room received little or no ventilation the ventilated barrels showed little decrease in the amount of scald.—D. Reddick.

MISCELLANEOUS

1618. ANONYMOUS. Botrytis. *Kew Bull. Misc. Inf.* [London] 1919: 93. 1919.

1619. ANONYMOUS. The dendrograph. *Sci. Amer.* 120: 365. 1919.—See Bot. Absts. 4, Entry 392.

1620. ARISZ, W. H. De structuur van het melksapvaatstelsel bij Hevea. [The structure of the lactiferous vessel system of Hevea.] *Arch. Rubbercult. Nederlandsch-Indië* 3: 139-155. 1919.—See Bot. Absts. 3, Entry 2410.

1621. BARTHEL, CHR. Försök med Dr. A. Kühns U-culturer. [Tests of Dr. A. Kühns' U-cultures.] *K. Landbr. Akad. Handl. och Tidskr.* 1919: 85-95. 1919.—See Bot. Absts. 4, Entry 1641.

1622. EWART, A. J. The cause of bitter rot. Proc. Roy. Soc. Victoria (N. S.) 30¹: 15-20. 1917. [Received in 1919.]—See Bot. Absts. 4, Entry 1281.

1623. LEGG, ALBERT TOM. The preparation of silica jelly for use as a bacteriological medium. Biochem. Jour. 13: 107-110. 1919.—An attempt is made to standardize the preparation of silica jelly so as to obtain uniform results. A clear and detailed description is given of the preparation of collodion membranes and of each step in the subsequent procedure in the formation of a uniform jelly. The critical factors pointed out are: (1) The use of a membrane of standard permeability, (2) a sufficiently long period for the sodium silicate and HCl to react after mixing, and (3) tubing the medium as quickly as possible after removal from the membrane and immediate autoclaving.—A. R. Davis.

1624. OSBORNE, W. A. A contribution to the theory of gel structure. Proc. Roy. Soc. Victoria (N. S.) 30: 153-158. 1918. [Received 1919.] (Contains papers read Sept. to Dec., 1917.)

1625. RANDS, R. D. De bruine binnenbastziekte van Hevea Brasiliensis (Voorloopige mededeeling.) [The brown bast disease of Hevea Brasiliensis.] Arch. Rubbercult. Nederlandsch-Indië 3: 156-159. 1919.—See Bot. Absts. 3, Entry 2732.

1626. SCHULTZ, T. S., DONALD FOLSOM, F. MERRILL HILDEBRANDT, AND LON A. HAWKINS. Investigations on the mosaic disease of the Irish potato. Jour. Agric. Res. 17: 247-273. Pl. A, B, and 25-30. 1919.—See Bot. Absts. 3, Entry 2755.

1627. SIMMONS, J. E. A comparison, with the standard plate methods, of some rapid methods for bacteriologic analysis of milk. Jour. Infect. Diseases 24: 322-336. 1919.—A large number of milks, varying in bacterial count from 50-160,000,000 per cc. were analyzed by 5 different methods: direct microscopic, standard plate, lactose plate, little plate (Frost) and reduction test. When the bacterial content of a milk was low (less than a million), all of the methods used gave satisfactory results, except the direct microscopic count; when the bacterial content of the milk was high, the direct microscopic method for the reduction test served best. The little plate furnished results in one-eighth to one-fifth of the time required by the other culture methods.—Selman A. Waksman.

1628. TALBOT, H. W. Definition of peat. Jour. Amer. Peat Soc. 12: 212. 1919.—See Bot. Absts. 4, Entry 1687.

1629. VAN SLYKE, H. D., AND H. A. SALVESEN. The determination of carbon monoxide in blood. Jour. Biol. Chem. 40: 103-107. 1919.

SOIL SCIENCE

J. J. SKINNER, *Editor*

F. M. SCHERTZ, *Assistant Editor*

GENERAL

1630. ALLEN, E. R., AND B. S. DAVISSON. An all-glass nitrogen apparatus. Ann. Missouri Bot. Gard. 6: 45-48. Pl. 2. 1919.—See Bot. Absts. 4, Entry 1486.

1631. BURD, JOHN S. Rate of adsorption of soil constituents at successive stages of plant growth. Jour. Agric. Res. 18: 51-72. Fig. 1-13. 1919.—See Bot. Absts. 4, Entry 1420.

1632. CARR, R. H. Vegetative growth in soils containing crude petroleum. Soil Sci. 7: 67-68. 1919.—Crude oil in amounts up to 27,000 pounds per acre has but little effect on the growth of soy beans in the soil tested. Larger amounts decreased the growth. The smaller amounts apparently favored nodule production and up to 72,000 pounds per acre did not com-

pletely inhibit it. The damage seems to be due to the inability of the plant to secure water with sufficient rapidity.—*William J. Robbins.*

1633. HESSELMAN, HENRIK. Studier över de norrländska tallhedarnas föryngringsvillkor. II. [Studies of natural reproduction in the pine heaths of Norrland.] Skogsvårdsföreningens Tidskr. 17: 29-76. Fig. 1-16. 1919.

1634. PARKER, R. C. Testing seed potatoes on Long Island. Potato Mag. 2³: 8, 22-23; 24: 19, 27-28. 1 fig. 1919.—See Bot. Absts. 3, Entry 2721.

1635. SIM, T. R. Soil erosion and conservation. South African Jour. Indust. 2: 1034-1042. 1919.—Within or in the vicinity of undamaged forest, erosion is rare. It is not usually the root mass which holds the soil, but the surface sponge which prevents water from running, or from gaining force if it does run. Certain classes of grass-veld are naturally tending toward the tree veld and should be in trees rather than in grass.—*E. P. Phillips.*

1636. STEINKOENIG, L. A. Relation of fluorine in soils, plants, and animals. Jour. Indust. Eng. Chem. 11: 463-465. 1919.—The percentage of fluorine in plants seldom rises above 0.002 per cent and most times it is below 0.001 per cent. [See also Bot. Absts. 4, Entry 2716].—*H. Schmitz.*

1637. SWANSON, C. O., AND W. L. LATSHAW. Effect of alfalfa on the fertility elements of the soil in comparison with grain crops. Soil Sci. 8: 1-39. 1919.—Analyses are reported for the nitrogen, phosphorus, calcium, and organic and inorganic carbon of the soil from old alfalfa fields, old cultivated fields and virgin sod wherever they could be found in close proximity. About 40 comparisons involving approximately 100 soils were made. In the humid and sub-humid sections of Kansas the alfalfa fields contained less nitrogen than the virgin sod but more than the cropped fields. In the semi-arid section the alfalfa fields contained more nitrogen than the virgin sod. The cropped fields contained less than the sod. In all three sections the alfalfa fields contain less organic carbon than the sod but more than the cropped fields. The phosphorus content of cropped soil was less than that in alfalfa or sod.—*William J. Robbins.*

1638. WALKER, S. S. The use of nickel crucibles for the J. Larence Smith fusion in determining soil potassium. Jour. Indust. Eng. Chem. 11: 1139-1140. 1919.—It is found that the same results for soil potassium are obtained whether the soil is fused in a platinum or nickel crucible, but that the nickel crucibles are attacked by the fusion mixture and are therefore not as satisfactory.—*Henry Schmitz.*

1639. WALSTER, H. L. Soil conditions and plant growth. [Rev. of: RUSSELL, E. J. Soil conditions and plant growth. 3d ed. 243 p., 14 fig. Longmans, Green and Co.: New York, 1917.] Bot. Gaz. 67: 171-173. Feb., 1919.

INFLUENCE OF BIOLOGICAL AGENTS

1640. ALLEN, E. R. Some conditions affecting the growth and activities of *Azotobacter chroococcum*. Ann. Missouri Bot. Gard. 6: 1-44. Fig. 1-2. 1919.—See Bot. Absts. 4, Entry 1532.

1641. BARTHEL, CHR. Försök med Dr. A. Kühns U-culturer. [Tests of Dr. A. Kühns' U-cultures.] K. Landbr. Akad. Handl. och Tidskr. 1919: 85-95. 1919.—A review of work on soil inoculation with cultures of free-living, nitrogen fixing bacteria and a presentation of bacteriological and cultural investigations with a "universal-culture" put out by Dr. A. Kühn of Berlin. U-cultures contain a mixed bacterial flora similar to that found in ordinary soil. No beneficial effect was found from its use in tests with oats, potatoes, and cabbage. Substantiates the belief of soil bacteriologists that, aside from the specific nodule bacteria of legumes, introduction of nitrogen fixing bacteria into normal soils is ineffective since these

organisms are normally present and can be rendered more effective only by making the soil more favorable for their growth and activity.—*E. G. Anderson.*

1642. BRISCOE, CHARLES F., AND H. H. HARNED. **Bacteriological effects of green manure.** Study No. 11. Mississippi Agric. Exp. Sta. Bull. 185: 8 fig. 1919.—See Bot. Absts. 4, Entry 36.

1643. CONN, H. J., AND J. W. BRIGHT. **Ammonification of manure in soil.** New York Agric. Exp. Sta. [Geneva] Tech. Bull. 67: 3–45. 1919.—A reprint of article in Jour. Agric. Res. 16: 313–350. 1919. [See Bot. Absts. 3, Entry 850.]

1644. FRED, E. B., W. H. PETERSON, AND A. DAVENPORT. **Acid fermentation of xylose.** Jour. Biol. Chem. 39: 347–384. Pl. 1. 1919.

1645. FRED, E. B., AND E. J. GRAUL. **Effect of inoculation and lime on the yield and on the amount of nitrogen in soy beans on acid soil.** Soil Sci. 7: 455–467. Fig. 1. 1919.—In pot and field experiments on sandy soils inoculation increased the yield of dry matter of soy beans which was further increased by the application of lime. On the silt loam used inoculation did not increase the yield but increased the per cent of protein in the crop. In a pot experiment in which the soil and crop were analyzed 323.5 pounds of the nitrogen in the plant on an acre basis came from the air and 130.4 pounds of nitrogen from the soil inoculated but unlimited. When limed and inoculated 389.0 pounds of nitrogen came from the air and 122.7 pounds from the soil.—*William J. Robbins.*

1646. NOYES, H. A. **Accurate determination of soil nitrates by phenol disulfonic acid method.** Jour. Indust. Eng. Chem. 11: 213–218. 1919.—Investigations to overcome the errors in the colorimetric (phenol disulfonic acid) method to determine soil nitrates are reported. The method is adapted to the accurate determination of soil nitrates in large as well as in small amounts.—*H. Schmitz.*

1647. ROBBINS, WILLIAM J., AND E. C. LATHROP. **The oxidation of vanillin to vanillic acid by certain soil bacteria.** Soil Sci. 7: 475–485. Fig. 1. 1919.—Vanillic acid was isolated from solution cultures containing nutrient mineral salts and vanillin and inoculated with a pure culture of a soil bacterium. In solution cultures vanillin is rapidly oxidized to vanillic acid by this bacterium. The vanillic acid at first accumulates in the culture solution but is later destroyed.—*William J. Robbins.*

1648. VASS, A. F. **The influence of low temperature on soil bacteria.** Cornell Univ. Agric. Exp. Sta. Mem. 27: 1039–1074. 1919.—The freezing of soils containing bacteria results in an increase in the bacterial count as determined by the agar-plate method. The author concludes that this is due to the fact that freezing and thawing results in breaking up the clumps of bacteria and not to any actual increase in the number of bacteria. The fact that freezing in salt and ice at -15°C ., or in liquid air at -190°C . for short periods, ranging from one minute to two hours, may result in increasing the bacterial count more than 100 per cent is given as proof that no bacterial growth occurs. The temperature of the water used in making the dilution and the rate of thawing seem also to have a marked effect on the bacterial count from samples of frozen soil, an increase in number accompanying an increase in temperature of the water up to about 30°C . When pure cultures of the non-spore-producing *Bacillus radicicola* were frozen in nutrient solutions in sand, in soil, and in solutions containing different concentrations of glycerin or glucose it was found that the presence of sand, soil or solutes offered considerable protection against the destructive effect of the freezing, and the higher the concentrations of the solutes, the greater was the protection. [See Bot. Absts. 4, Entry 1592.]—*Otis F. Curtis.*

SOIL ACIDITY

1649. CONNER, S. D., AND H. A. NOYES. **Natural carbonates of calcium and magnesium in relation to the chemical composition, bacterial content and crop-producing power of two very acid soils.** Jour. Agric. Res. 18: 119–125. Pl. 1–2. 1919.—Pot cultures were used. The

crops grown were wheat, red clover, and blood turnip beets. The two soils used were an acid silty clay, low in organic matter, and an acid black peaty sand high in organic matter.—When 4000 pounds of calcite, magnesite and dolomite were applied to both soils the results were similar. The differences between the calcite, magnesite, and dolomite increases were small for the wheat and clover, while magnesium carbonate gave much larger increases with the beets. With a 12,000-pound application, magnesite caused injury on the black soil but an increase in crop yield on clay soil. Although the magnesite caused as much wheat increase in all, except the 12,000-pound magnesite application on the black sand, there was at times during vegetative growth a tendency toward tip burning wherever magnesite was applied. Magnesite favored nitrification more than calcite. On the yellow clay soil, magnesite also favored better growth of aerobic and anaerobic bacteria than did calcite. On the black sand soil the reverse was true.—*J. M. Brannon.*

1650. CROCKER, WILLIAM. *Soil acidity.* [Rev. of: HARTWELL, B. L., AND F. R. PEMBER. *The presence of aluminum as a reason for the difference in the effect of the so-called acid soil on barley and rye.* Soil Sci. 6: 259-279. 1 pl. 2 fig. 1918 [See Bot. Absts. 2, Entry 1137].] Bot. Gaz. 67: 519-1919.—The reviewer notes that this paper shows the complexity of the apparently simple problem of soil acidity, and adds that he has noticed that "the hydrogen ion concentration found in acid soils by the gas chain method is generally only a fraction of the hydrogen ion concentration necessary to reduce the growth rate of plants in water or sand cultures."—*H. C. Cowles.*

1651. FUNCHESS, M. J. *Acid soils and the toxicity of manganese.* Soil Sci. 7: 69. 1919.—Previously (Alabama Agric. Exp. Sta. Bull. 201) the author concluded that the toxicity to plants of certain plots on the Alabama Agric. Exp. Sta. farm was due to soluble manganese produced by the action of nitrogenous fertilizers. Further studies indicate that the toxicity observed in these soils after incubation with a nitrogenous fertilizer and in their extracts is probably due to uncombined acid or readily hydrolyzable salts but not to manganese.—*W. J. Robbins.*

1652. HILL, H. H. *A comparison of methods for determining soil acidity and a study of the effects of green manures on soil acidity.* Virginia Agric. Exp. Sta. Tech. Bull. 19. 25 p. 1919.—The author points out that as a rule Virginia soils are very deficient in organic matter and that this deficiency may be overcome by the practice of green manuring. The ash of plants is alkaline and on decomposition exerts a marked influence in correcting soil acidity resulting from the incorporation of green crops with the soil. Plants remove calcium from the soil. Legumes remove more than non-legumes. The young plants contain slightly more lime than the mature ones. In turning under crops the calcium in the plant is returned to the soil thereby exerting a certain effect in correcting soil acidity. The method of Veitch in estimating soil acidity, though quite reliable, is long and tedious. The Jones method is rapid and on comparison with the Veitch, fairly concordant results are obtained and applications of lime by its use have approached very near the actual field conditions. The Jones method differentiates applications of phosphoric acid on plats which have produced corn over long periods. This distinction is very clear-cut. In pot experiments, with the leading types of Virginia soils, the incorporation or plant tissue produced a very slight increase in soil acidity. This, however, was not excessive. In pot experiments, green manures did not inhibit a vigorous nitrate development and plant growth was materially increased. In field experiments with soybeans, buckwheat, red clover and rye, with corn and wheat, no marked acidity was developed during a five-year period. The turning under of the green manure crops was not detrimental to a strong nitrate production, nitrogen fixation and plant growth. With field experiments where the green crops were turned under at intervals of two weeks throughout their development, no injurious effects were observed as a result of this practice and after the second crop had been turned under the lime requirement of the soil was diminished rather than increased. Rye shows a decided initial acidity but this condition quickly passes off. The indications are that this initial acidity is not of serious harm to the plant on account of its transitory nature. The common belief that a green manure practice is a harmful one, is not

substantiated by the results obtained. From the results obtained on soils receiving green manures the general tendency is toward the creation of an alkaline condition in the soil, rather than an acid one. In a well-planned rotation, taking into consideration the loss of bases in the drainage water and the restoration of these bases by means of moderate applications of lime, at regular intervals, little, if any, harm should result from the turning under of green crops as a means of replenishing the store of organic matter in the soil.—*H. Hill.*

1653. HOAGLAND, D. R. **Relation of the concentration and reaction of the nutrient medium to the growth and absorption of the plant.** Jour. Agric. Res. 18: 73-117. Fig. 1-4. 1919.—See Bot. Absts. 4, Entry 1424.

1654. HOAGLAND, D. R., AND A. W. CHRISTIE. **The effect of several types of irrigation water on the P_H value and freezing point depression of various types of soils.** Univ. California Publ. Agric. Sci. 4: 141-157. 1919.—The effects of artificially prepared "alkali" waters upon some physico-chemical properties of seven distinct types of soils was determined. Methods of investigation included electrometric determinations of the OH ion concentration, freezing point determination of total concentration of the soil solution, and chemical analysis of water extracts of the soils. The analyses were calculated in terms of the characteristic groups as proposed by the United States Geological Survey. Their reaction values are obtained from the expression $\frac{V}{W} C$, where V = valence of the ion, W = the atomic weight, and C = concentration in parts per million. The characteristic groups represent the percentage properties of the water and are independent of concentration. Different waters may thus be classified readily irrespective of total concentration.—The soil must be considered as a chemical system in which the effect of any added water will be modified by the chemical and physical reactions in the soil. Consequently it is not sufficient to calculate the amount of sodium salts added to an acre of soil by a given number of inches of irrigation water.—It is not possible to compute the extent to which a given quantity of salt will increase the depression of the freezing point in a soil of optimum moisture content unless account is taken of the free and unfree water.—Waters with a high percentage of primary alkalinity applied in moderate quantities to soils produced greatly increased OH ion concentrations, especially in light sandy soils.—Waters with high concentrations of alkali salts soon produced excessive concentration of the soil solution.—Any appreciable increases in OH ion concentration of the soil (especially when exceeding P_H 8.5) appear to be injurious to seedlings.—The determination of the OH ion concentration and freezing point depression of soils may be more practical and useful as a basis of interpretation than the procedures hitherto used in analyzing alkali soils.—*H. S. Reed.*

1655. MACINTIRE, WALTER HOGE. **The carbonation of burnt lime in soils.** Soil Sci. 7: 325-453. Pl. 1-4, fig. 1-11. 1919.—Extensive studies in vitro and in soil show that calcium oxide and calcium hydroxide in 2-4-ton applications will revert to the carbonate if left on the soil surface for several days prior to inworking. This reversion will occur more rapidly during humid atmospheric conditions. Less rapid carbonation occurs when the oxide or hydrate is mixed with the soil. Neither the oxide nor hydrate can be considered chemically destructive of soil organic matter when used in the amounts and in the manner considered as practical applications. If the oxide or hydrate is incorporated within the upper zone of the soil, prior to a more thorough dissemination throughout the soil the concentration thus affected will bring about in the treated zone a temporary or partial sterilization.—*William J. Robbins.*

1656. NOYES, H. A. **Soil acidity—the resultant of chemical phenomena.** Jour. Indust. Eng. Chem. 11: 1040-1049. 1919.—The reaction of a soil at any time is dependent both on the nature and the proportions in which its constituents are present with water. Changing the water content, removing substances from solution, and the addition of other substances change the reaction in accord with the working of the law of mass action. The solubilities of substances, the possibilities of combination, and the rate at which reactions take place in soil

vary so that the condition of a soil at any time can be considered but a stage in its progress toward a constantly shifting equilibrium in accordance with the principle of Le Chatelier.—*Henry Schmitz.*

1657. RABATE, E. *Recherches sur la réaction des terres.* [The reaction of soils.] *Compt. Rend. Acad. Agric. France* 5: 854-858. 1919.—Discusses methods of demonstrating alkalinity or acidity of soils and the cultural practices to be followed in consequence.—*E. A. Bessey.*

1658. STEPHENSON, R. E. Activity of soil acids. *Soil Sci.* 8: 41-59. 1919.—Soil acids capable of giving a toxic hydrogen ion concentration react rather quickly (2 weeks in the experiment reported) with calcium carbonate but soils may contain a large reserve of acidity which is capable of decomposing calcium carbonate slowly for a considerable period of time (21 weeks in the experiment noted).—*William J. Robbins.*

1659. TRUOG, EMIL, AND M. R. MEACHAM. Soil acidity: II. Its relation to the acidity of the plant juices. *Soil Sci.* 7: 469-474. 1919.—The hydrogen ion concentration of juice pressed from plants grown in strongly acid soils is generally greater than that of the juice of plants grown on the same soil limed. Lupines were an exception. The juice of plants cut in the morning is more acid than that of plants cut in the afternoon. A difference between the acidity of the juice of tops and roots of the same plant is noted.—*William J. Robbins.*

FERTILIZATION

1660. CRUICKSHANK, ROBERT B. Orchard fertilization. *Trans. Indiana Hortic. Soc.* 1918: 121-137. 1 pl., 3 fig. 1919.—See *Bot. Absts.* 4, Entry 915.

1661. HARTWELL, BURT L. The manurial value of a modification of orthoclase-bearing rock where only potassium was deficient. *Jour. Amer. Soc. Agron.* 2: 326-329. 1919.—The paper reports the results of an inextensive field trial conducted at the Rhode Island station during six years.—*F. M. Schertz.*

1662. HEDRICK, U. P., AND R. D. ANTHONY. Twenty years of fertilizers in an apple orchard. *New York Agric. Exp. Sta. [Geneva] Bull.* 460: 71-96. Fig. 1. 1919.—See *Bot. Absts.* 4, Entry 931.

1663. JOHNSON, M. O. [Soil investigations.] *Hawaii Agric. Exp. Sta. Rept.* 1918: 23-26. Pl. 5. 1919.—A rapid approximate method of determining the lime requirements of Hawaiian soils as developed at this station is referred to. Fertilizer experiments with rice, bananas, and pineapples are reported, with special attention given to the application of iron sulphate in the form of spray to overcome the deleterious effect of abnormal quantities of manganese in pineapple fields. Burnt lime has proved partially effective in controlling pineapple wilt but can not be considered entirely successful.—*J. M. Westgate.*

1664. IVERSEN, KARSTEN. Lokale Forsøg med Kunstgodning til Korn og Rodfrugt. Vd-forte paa Fyn i darene 1901-1915. [Local experiments with fertilizers for cereals and root crops. Performed in Fyn in the years 1901-1915.] *Tidsskr. Landbrug. Planteavl* 26: 193-297. 1919.—The objects of the experiments were to determine (1) the fertilizer needs of the soil in each locality and (2) the effects of fertilizers on various crops under varying conditions.—Similar plans were used for each set of experiments, which were performed on 4 to 8 replicate plots. Differences between crops on fertilized and unfertilized plots were noted on the following number of experiments; 126 with barley, 49 with oats, 191 with mangolds, 41 with sugar beets. Stable manure was used in the experiments with mangolds and sugar beets, but not with oats and barley.—It was found that the effect of sodium nitrate, superphosphate and potassium is greater when used three together than when used singly or in pairs. The needs of the crop for fertilizer depended largely on the chemical composition of the crops, as determined by the average analysis for the four species.—The assimilation of the fertilizer and the effect of

climatic conditions on the utilization of artificial fertilizers are discussed. It was found that the climatic conditions having a stimulating effect on the size of barley and oat crops, likewise favored the utilization of the artificial fertilizers. Cold dry summers seemed to favor barley grain and cold wet summers favored oats. In the case of mangolds and sugar beets (where stable manure was used in addition to the artificial fertilizers) it was found that the climatic conditions favorable to the size of the crop were usually unfavorable to the utilization of the artificial fertilizers. Hot summers being favorable to the root crops, the heat likewise favored the decomposition of the stable manure, hence there was less need for the nourishment contained in the artificial fertilizers. Artificial fertilizers are more economically applied to the root crops during cold, wet summers rather than during warm, dry summers.—When commercial fertilizers were used separately, it was found that potassium gave the best average results in warm, dry summers and phosphates in cold, wet summers.—The results were studied in reference to the relation between the productive capacity of the soil and the size of the excess crop when using artificial fertilizers.—*Albert A. Hansen.*

1665. JONES, C. BRYNER. **The breaking up of permanent grass in 1918.** Jour. Roy. Agric. Soc. England 79: 24-44. 1918.—A general discussion of the crop results and soil treatments of the permanent grass land of England which were planted in cultivated crops during the war. The success of the crops on the heavier types of soil is a question of tilth, which is influenced largely by the time of plowing. The applying of lime and suitable fertilizers, principally phosphates, contributed materially to the success of the crop.—*J. J. Skinner.*

1666. KRISTENSEN, R. K. **Konservering af Ajle.** [Preservation of liquid manure.] Tidskr. Landbrug. Planteavl 26: 485-490. 1919.—Experiments in the laboratory of the State Experiment Station at Askov on the preservation of liquid manure attempted by the addition of sulphuric acid and superphosphate. An analysis of the liquid manure showed 0.478 per cent nitrogen and 0.418 per cent nitrogen in ammonia. The preservatives were added and the manure placed in a water bath and vaporized. It was found that two-thirds of the acid is bound by ammonia, and one-third by other bases. Absolutely no effect on the loss of ammonia was observed by the addition of small amounts of acid. In order to bind all the ammonia contained in 5 cm. of manure, 1.3 grams of superphosphate, containing 18 per cent P_2O_5 , was necessary.—*Albert A. Hansen.*

1667. MOSSÉRI, VICTOR M. **Note sur les dépôts nilotiques des Gazayer et Saouahel d'Égypte.** [Note on the deposits of the Nile of the "Gazayer" and "Saouahel."] Bull. Union des Agric. Égypte 17: 49-78. 1919.—See Bot. Absts. 4, Entry 109.

1668. RAMSAY, J. T. **Manuring for profit. Results of experiments in potato cultivation.** Jour. Dept. Agric. Victoria 17: 471-475. Fig. 2. 1919.—Experiments with fertilizers on potatoes growing on a dark sandy soil gave best results with 600 pounds per acre of bone and superphosphate and 100 pounds of ammonium sulphate.—*J. J. Skinner.*

1669. ROSSEM, C. VAN. **Bemestingsproeven in den proeftuin. Verslag over het jaar 1918, tevens samenvatting van de resultaten met die der voorafgaande jaren.** (Fertilizer experiments and report for 1918 together with a summary of the results of previous years.) Mededeel. Algem. Proefsta. Landb. Dept. Landb., Nijverheid en Handel, [Buitzenorg] 2: 1-40. 1919.—Extensive comparisons are made of various artificial manures with regard to their effect on the production of rice. In six tests calcium nitrate had about the same effect as ammonium sulphate while both were more favorable than Chili saltpeter. Sulphuric acid appeared to have no influence on rice production. Calcium carbonate increased the yield. Chili saltpeter and ammonium sulphate were compared in production of cassave and the results showed that the former used singly or in combination with superphosphate gave the highest yields.—*R. D. Rands.*

1670. RUSSELL, G. A. **The effect of fertilizers on the composition of hops.** Jour. Indust. Eng. Chem. 11: 218-224. 1919.—See Bot. Absts. 4, Entry 122.

1671. WAITH, F. G., AND MAUNG PO SHIN. The phosphate requirement of some Lower Burma paddy soils. Mem. Dept. Agric. India Chem. Ser. 5: 132-155. Pl. 1-3. 1919.—Fertilizer experiments in pots on a number of soils from different parts of Lower Burma, India, were made to determine the effect of phosphoric acid and nitrogen separately and combined. Increased growth was produced from both acid phosphate and ammonium sulphate used singly. The increase was much longer when the two were used together. Each of the soils responded well to the treatment. Analyses made of soils from different regions show that those from around Nyaunglebin and Daiku are low in lime, and high in potash and phosphoric acid. The soils of the Hlaing valley along the Prome are high in magnesia, potash, and phosphoric acid but low in lime. From the neighborhood of Taungoo and from the Pequ, Insein, and Hanthawaddy districts the soils are poor in lime, potash, magnesia and phosphoric acid. It is stated that most of these soils are neutral or acid, while the older soils are distinctly acid. A map is given showing the soils of the regions, which are low and those which are high in phosphoric acid. It is concluded that the lack of phosphoric acid is by no means general all over Lower Burma, and that the deficiency is serious only within definite areas. Phosphoric acid fertilization of soils deficient in phosphoric acid cannot increase crop yields without the addition of nitrogen.—*J. J. Skinner.*

1672. WIANCKO, A. T. Commercial fertilizers for Indiana: What to use. Purdue Univ. Agric. Exp. Sta. Circ. 92. 7 p. 1919.—Advice to farmers.—*M. W. Gardner.*

1673. VOELCKER, J. A. The Woburn Experimental Station of the Royal Agricultural Society of England. Jour. Roy. Agric. Soc. England 79: 263-284. 1918.—Under the heading of field experiments are reported the 42nd year's results of the fertilizer experiments with the continuous growth of wheat and of barley. The ammonium sulphate plots in both series have failed entirely as in former years. Wherever ammonium sulphate was used whether singly or with other mineral fertilizers the yields are decreased. Where lime has been used the ammonium sulphate has given good yields. The largest yield in the wheat series was secured with mineral fertilizer and sodium nitrate. In the grass experiments largest yields were secured with basic slag and potassium sulphate. Under the head of pot culture experiments are reported the results of work with iron compounds on wheat. The magnetic oxide (Fe_3O_4) has a slightly stimulating influence. Ferrous chloride (FeCl_2) has a markedly beneficial effect when not exceeding 0.1 per cent of iron in the soil, it is harmful in larger amounts. Ferric chloride proved decidedly toxic and prevented growth if present to the extent of 0.2 per cent iron in the soil. Experiments are reported to show, the time of applying of ammonium sulphate for best results, the effect of various phosphate and lime materials, no conclusive results were secured.—*J. J. Skinner.*

SOIL CLASSIFICATION

1674. BECK, M. W., AND O. P. GOSSARD. Soil survey of Mahoning County, Ohio. Advance sheets—field operations Bur. Soils, U. S. Dept. Agric. 1917: 5-41. Fig. 1, and map. 1919.—Mahoning County is drained by the Mahoning River and has a general northward slope. Lying as it does in northeastern Ohio, against the Pennsylvania line, it is entirely within the glaciated region and its soils are either glacial or alluvial in origin.—Youngstown is the county seat and one of the best markets in Ohio. Its population is 125,000 which is four times the rural population of the county. The area is well supplied with railroads. It has a large mileage of improved highways and its dirt roads receive constant attention.—The rainfall averages 38 inches and is evenly distributed. The winters are long but only moderately severe. The summers are not excessively hot.—The upland soils are glacial till and cover 93 per cent of the area. The light glacial material is classified as *Wooster*. Where bed rock occurs at 3 feet or less the series is *Lordstown*. With progressively poorer drainage *Canfield*,—*Volusia* and *Trumbull* series are recognized. Of the thick till overlying the shale of the northern and western part of the county the *Ellsworth* is found in the best drained areas and the *Mahoning* in the poorly drained portions. The terrace and alluvial soils are not of great importance except locally. Some areas of muck occur which are desirable for trucking. In general the soils of the county are productive but need lime, organic matter and drainage.—On

the heavy soils of the *Mahoning* and *Ellsworth* series oats and hay are grown. Corn does not do as well here as upon the *Wooster*, *Canfield* and drained *Volusia*. Corn and potatoes are the important crops on these soils. Oats grow well on almost all the soils of the area. Hay is produced on 50 per cent of the farmed land of the county. General farming, dairying, trucking and orcharding are the principal types of agriculture.—*H. O. Buckman*.

1675. COBB, W. B., AND S. F. DAVIDSON. Soil survey of Caldwell County, North Carolina. Advanced sheets—field operations Bur. Soils, U. S. Dept. Agric. 1917: 5-29. *Fig. 1, and map (colored)*. 1919.—Caldwell County is situated in the northwestern part of the state. The northern two-thirds lie in the mountainous Appalachian region while the rest consists of the undulating Piedmont plateau. The area is drained by the Catabau and Yadkin Rivers and their tributaries.—The climate is very favorable for agriculture. The growing season is about 6 months in length, with adequate rainfall. The total precipitation is 50 inches. The winters are mild.—Most of the highways are but fair even in summer. Two railroads serve the county. Lenoir is the county seat with a population of 3364. Eighty-four per cent of the county's population is rural.—The soils of the area occur in three provinces, Appalachian Mountain, Piedmont Plateau and River Flood Plain. The Appalachian soils (largely of the *Porters* and *Ashe* series) making up 60 per cent of the county although often productive are not extensively farmed due to their rough topography. The *Cecil* and *Louisa* series dominating in the Piedmont section are good general farming soils capable of being built up into a high state of fertility. The alluvial soils, which comprise 5 per cent of the area, are almost wholly utilized and are in a very high state of productiveness.—General farming predominates with corn as the principal crop. It is grown indiscriminately although it does best on bottom land. Wheat, oats and potatoes are also grown according to the character of the soil.—*H. O. Buckman*.

1676. KOCHER, A. E., AND A. T. STRAHORN. Soil survey of Benton County, Washington. Advance sheets—field operations Bur. Soils, U. S. Dept. Agric. 1917: 5-72. *Fig. 1 and 2. Plates I, II and III and map (colored)*. 1919.—Benton County lies just east of the Cascades on the southern edge of the state. It occupies a peninsula-like position in one of the larger bends of the Columbia, which bounds it on the north, east and south. Drainage is either directly into the Columbia or indirectly thereto by the Yakima River which flows eastward through the center of the area.—The topography of the county ranges from mountains, plain-like plateau and scab lands to high river terraces and recent alluvium, although the latter is much restricted by the gorge character of the master streams.—The climate is arid with a mean precipitation at Kennewick on the Columbia of 6.3 inches. The snowfall varies from a few inches in the valleys to over 2 feet in the mountains, which rise to 3500 feet in places. The mean annual temperature at Kennewick is 54°F., the mean for July being 77°F. and for January 31°F. The growing season is about 170 days in the valleys.—The agriculture is of two types, dry farming and irrigation. The former, which is least important, is carried on upon the upland loess (*Ritzville* series) and valley fill soils (*Sagemoor* and *Burke* series). These soils occupy over one-half of the county. Wheat is the principal crop.—Irrigation is confined exclusively to the valleys due to the difficulty of supplying water to the uplands. Here old high water terraces (*Ephrata* series largely) are of the greatest importance although in places alluvial soils (especially the *Prosser* series) are valuable. The northeastern corner of the county as well as certain southern portions is occupied by sandy wind blown materials of little agricultural value. These deposits cover 21 per cent of the area.—Ninety-five per cent of the people live in the valleys and fruit growing to which the climate and the sandy terrace and alluvial soils are adapted is the principal occupation. Apples, peaches, cherries, pears and grapes are of particular importance especially about Kennewick, Prosser and Richland. Vegetables are a valuable crop together with alfalfa which supports important dairy interests. Hog raising and winter sheep grazing and feeding are also engaged in to a certain extent.—*H. O. Buckman*.

1677. LATIMER, W. J. Soil survey of Barbour and Upshur Counties, West Virginia. Advance sheets—field operations Bur. Soils, U. S. Dept. Agric. 1917: 5-51. *Fig. 1 and map (colored)*. 1919.—The counties in question lie on the markedly eroded portion of the Appalachian

plateau in north central West Virginia. Upland areas predominate with elevations ranging from 1000 to 3000 feet. The area drains westward and southward into the Ohio system.—Railroad facilities are well supplied and the public roads are good despite the rough topography. Small towns and mining camps furnish an opportunity for the local sale of produce while Baltimore and Pittsburgh are the principal large markets.—The climate is healthful and well suited to stock raising and general farming. The mean winter temperature at Philippi in central Barbour County is 32°F. while the summer mean is 70°F. A rainfall of about 48 inches is distributed through the year and proves ample during the growing season.—Over 93 per cent of the soils are residual from the alternating beds of shale, sandstone and limestone of the Carboniferous. Of these soils the *Dekalb* is by far the most prominent although not the most productive. A large percentage of it is either too steep or too stony for cultivation. All of the residual soils need lime. A little over 6 per cent of the area is alluvial and where well drained is very productive. Unclassified rough stony land makes up 8 per cent of the counties.—The population of the area in 1910 was 32,487, the northwest corner of Upshur County being the most thickly settled. Most of the inhabitants of both counties are engaged in agriculture although mining and lumbering receive much attention. The principal crops are hay, corn, wheat, buckwheat and oats. Great areas of hay land and permanent pasture occur. The hay and corn are used largely to feed the horses, hogs and cattle, the sale of the last two being a main source of revenue. Apples, peaches and small fruits are grown on almost every farm but seldom commercially.—*H. O. Buckman.*

1678. MAXSON, E. T., AND J. H. BROMLEY. Soil survey of Saratoga County, New York. Advance sheets—field operations Bur. Soils, U. S. Dept. Agric. 1917: 5-42. *Fig. 1, and map (colored).* 1919.—Saratoga County lies in eastern New York and occupies the angle formed by the juncture of the Mohawk River with the Hudson. Its topography is varied, ranging from the smooth outwash plains and glacial lake beds of the eastern part to the rough stony spurs of the Adirondacks of the west and north. Most of the agricultural land lies in the former portion, ranging from 200 to 1000 feet in elevation.—Much of the area has good railroad service. Telephone and rural mail delivery extends to every part of the county, while state roads especially in the eastern and southern part facilitate traffic. The local markets are especially good. Troy, Albany, New York and Boston are the leading outside shipping points.—The winters are long and severe with heavy snowfall. The summers are mild and brief. The growing season is 141 days. The precipitation is about 40 inches evenly distributed throughout the year.—Not over 75 per cent of the county is in farms. The main occupation is dairying and general farming. Corn, oats, hay, rye and potatoes are the principal crops. Milk and butter are shipped to outside markets. Vegetables and fruits are grown for local consumption. The natural vegetation of the county is varied and interesting.—The soils are largely of glacial origin, 45 per cent of the county being covered with till (*Gloucester* and *Dutchess* series). Only the latter is of agricultural value and its area is small. Outwash and terrace soils (*Hinkley* and *Merrimac* series) occur over one-third of the area. These soils are sandy and gravelly. They support general and special crops. The heavy glacial like soils (*Vergennes* series) occur in small extent and are utilized for hay and grain. Poorly drained alluvial soils are found along most of the stream. Small areas of muck occur, the largest being near Saratoga Springs. None of the areas are under cultivation.—*H. O. Buckman.*

1679. MOONEY, C. N., E. T. MAXSON, R. J. MORGAN, AND J. H. BROMLEY. Soil survey of Oswego County, New York. Advance sheets—field operations Bur. Soils, U. S. Dept. Agric. 1917: 5-43. *Fig. 1 and map (colored).* 1919.—Oswego County lies in the north central part of New York State at the eastern end of Lake Ontario into which it drains. It covers 948 square miles with a topography ranging from rolling to hilly.—Its climate is variable with long snowy winters and short pleasant summers during which few days rise above 95°F. The growing season covers about 190 days.—The soils of the county are largely glacial till (56 per cent) of the *Worth* and *Ontario* series. Both are calcareous, the latter being especially so. The *Worth* stony loam and the *Ontario* loam predominate. They are both adapted to hay, silage corn, oats, beans and fruit. The stonier phase of the former supports prosperous dairy-

ing while most of the commercial orchards occur on the latter.—Sixteen per cent of the county is covered with glacial lake sediment (*Dunkirk* series) while almost as much more is mantled with kame and kettle débris, outwash and delta material and alluvium embracing a number of minor series and types. The sandier phases predominate in these heterogeneous soils and grow excellent beans, silage corn and potatoes. The heavier phases, especially of the *Dunkirk*, are adapted to grass and grain.—Meadow lands of little value cover 6 per cent of the county. Muck of slightly greater extent and of much higher value also exists in scattered areas. Excellent onions, lettuce, celery and beets are raised on this soil.—*H. O. Buckman*.

1680. WINSTON, R. A., R. W. McCLURE, H. P. COOPER, AND D. C. WIMER. *Soil survey of Clearfield County, Pennsylvania*. Advance sheets—Field operations Bur. Soils, U. S. Dept. Agric. 1916: 5-32. *Fig. 1 and map (colored)*. 1919.—Clearfield County is situated entirely within the Alleghany Plateau just west of the center of the state. It is marked by a steeply rolling to hilly topography although level or gently sloping areas occur on hill crests. The drainage is northeastward into the West Branch of the Susquehanna.—Excellent railroad facilities are available in the county. Public roads are numerous and well kept. Coal mining and lumbering are the principal industries although agriculture is practiced over all of the county except the hilly unproductive northern section.—The climate is healthful. The winters are cold and the summers cool and pleasant. The mean temperature is 46°F., the mean for January being 23°F. and that of July 70.6°F. A well distributed rainfall of 44 inches occurs. The growing season ranges from 116 to 154 days.—The soils of the county are largely of the *Dekalb* series, an upland residual soil from the shales and sandstones of the Coal Measures. This series universally is in need of lime. Twenty per cent of the series is too rough and stony for cultivation. The level portions, however, are quite productive when well managed. Gravelly, sandy and stony types predominate.—The alluvial soils of the area are not extensive as the streams flow through narrow valleys. When such soils occur they are usually wet and unproductive. Second bottom deposits (*Holston* series) while of very small area are rich and grow excellent grain, hay and truck.—Corn, oats, wheat, buckwheat, rye, timothy, clover, potatoes and vegetables are the principal crops. Alfalfa is raised in small acreage. Apples, pears, plums and cherries are grown but usually only for home use. Dairying is carried on in a small way. Some hogs, sheep and beef cattle are raised on almost every farm.—*H. O. Buckman*.

PEAT AND MUCK

1681. ANONYMOUS. *New Jersey peat industry in 1917*. Jour. Amer. Peat. Soc. 12: 188. 1919.—Peat production for fertilizer was greatly stimulated during the war. New Jersey leads all the other states in this. The peat is mostly treated chemically and then inoculated with bacteria to increase its fertilizer value. Some peat is used as an antiseptic and some for stock feed.—*G. B. Rigg*.

1682. BOTTOMLEY, W. B. *Nucleic derivatives from peat*. Jour. Amer. Peat Soc. 12: 226. 1919.—See Bot. Absts. 4, Entry 1488.

1683. CUTTING, M. C. *Peat soils of Minnesota and their cultivation*. Jour. Amer. Peat Soc. 12: 190-194. 1919.—See Bot. Absts. 4, Entry 54.

1684. FEILITZEN, H. VON. *Cultural experiments on moor lands*. Jour. Amer. Peat Soc. 12: 216-217. 1919.—See Bot. Absts. 4, Entry 64.

MISCELLANEOUS

1685. JENNINGS, A. C. *The economic aspect of irrigation*. Rhodesia Agric. Jour. 16: 429-432. 1919.

1686. SIM, T. H. **Soil erosion and conservation.** South African Jour. Indust. 2: 962-968. 1919.—Afforestation is the key to soil conservation, and it is possible to make it effective in many localities where meantime soil conservation is badly needed; nevertheless afforestation and soil conservation belong to separate, and usually widely separated districts, the former only acting to the other district as the transmitter of the moisture which it requires in order to grow and maintain an efficient vegetation. Afforestation is a matter of the first importance, indeed it is the controlling factor as to whether or not the sub-continent shall remain for long habitable enough to permit of the community dealing much further with all or any of its other "burning subjects."—*E. P. Phillips.*

1687. TALBOT, H. W. **Definition of peat.** Jour. Amer. Peat Soc. 12: 212. 1919.—"Peat is partly decomposed and disintegrated vegetable matter that has in one way or another accumulated in areas of poor drainage where chemical changes, incident to ordinary atmospheric conditions have been retarded or suspended."—*G. B. Rigg.*

1688. TORRANCE, WM. **Observations on soil erosion.** Union of South Africa Dept. Agric., Bull. Gen. Ser. 1919⁴. Pl. 1-8. 1919.

1689. WRIGHT, C. HAROLD. **The alluvial soils of Fiji.** Dept. Agric. Fiji Bull. 11. 12 p. 1919.—Mechanical and chemical analyses of the alluvial soils of Fiji, with notes on their relations to banana and sugar-cane culture.—*C. V. Piper.*

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

E. B. PAYSON, *Assistant Editor*

1690. ANONYMOUS. **Additions to the herbarium.** Brooklyn. Bot. Gard. Rec. 8: 142-143. Oct., 1919.—Accessions to the herbarium of the Brooklyn Botanic Garden in 1919 include the personal herbarium of woody plants (6000 specimens), collected and determined by CAMILLO KARL SCHNEIDER at the Arnold Arboretum, 1916-1919.—*C. S. Gager.*

1691. BATES, J. M. ***Kochia alata*.** Amer. Bot. 25: 110. 1919.—Further notes on the specific distinctness of *Kochia alata* from *K. scoparia*.—*W. N. Clute.*

1692. BEAUVISAGE, L. **Étude anatomique de la famille des Ternstroemiacées.** [Anatomical studies in the family Ternstroemiaceae.] Univ. de Toulouse Faculté de Médecine et de Pharmacie No. 24. 230 p. 109 fig. 1918.

1693. BECCARI, O. **Palms of the Philippine Islands collected and distributed by A. D. E. Elmer.** Leaflet Philippine Bot. 8: 2997-3067. Aug. 25, 1919 (Article 120).—This article contains notes on about 75 species of palms, in many cases these data being of special value as they are reproductions of the collector's field notes covering the gross characters, habit, and appearance of the various species. The following are described as new: *Areca Caliso*, *Pinanga sibuyanensis*, *P. urdanetensis*, *Ptychoraphis intermedia*, *Heterospathe sibuyanensis*, *Orania philippinensis* Scheff. var. *sibuyanensis*, *O. decipiens* var. *montana*, *Caryota Rumphiana* Mart. var. *philippinensis*, *Livistona rotundifolia* Mart. var. *luzonensis* et var. *microcarpa*, *Dacmonorops pannosus*, *D. oligolepis*, *D. urdanetensis*, *D. pedicellaris*, *D. affinis*, *D. gracilis*, and *monorops pannosus*. The following new combinations occur: *Ptychoraphis Elmeri* (*Heterospathe Elmeri* Becc.), and *Heterospathe philippinensis* (*Ptychoraphis philippinensis* Becc.). A key to the genera, prepared by Mr. Elmer, is included.—*E. D. Merrill.*

1694. BECKER, WILH. **Violae Asiaticae et Australenses. III.** [Violets of Asia and Australia. III.] Beih. Bot. Centralbl. 36^u: 15-59. 1918.—In this article are treated the groups *Curvato-pedunculatae* W. Bckr. (with subgroups *Flagellatae* Kittel and *Eflagellatae* Kittel), *Vaginatae* W. Bckr., *Cinereae* (Boiss. mutat. charact. et p. p.) W. Bckr., *Dischidium*

Ging. (with subgroups *Longicalcaratae* W. Bckr. and *Brevicalcaratae* W. Bckr.), *Chamaemelum* Ging. (with subgroups *Monophyllos* W. Bckr. and *Nudicaules* W. Bckr.). In these groups there are presented as new names: *Viola odorata* L. var. *Amani* (Post) W. Bckr. comb. nov., *V. pontica* (southern Russia, Caucasus, Turkestan, etc.), *V. alba* Besser subsp. *Sintenisii* (W. Bckr.) W. Bckr. comb. nov., *V. cinerea* Boiss. var. *Stocksii* (Boiss.) W. Bckr. comb. nov., *V. cinerea* Boiss. var. *Stocksii* (Boiss.) W. Bckr. forma *kathiawarensis* (W. Bckr.) W. Bckr. comb. nov., *V. biflora* L. vars. *hirsuta* W. Bckr. (Sikkim) and *nudicaulis* W. Bckr. (Thibet), *V. Delavayi* Franchet var. *ciliosa* W. Bckr. (eastern Thibet), *V. orientalis* W. Bckr. var. *conferta* (southeastern Manchuria etc.). An additional list, with descriptions, of new violets from Asia is appended. These are *V. sphaerocarpa* (central China), *V. pendulicarpa* (northern China), *V. kansuensis* (northern China), *V. carnosula* (Kamchatka), *V. placida* (Sikkim) and *V. tenuicornis* W. Bckr. var. *brachytricha* (China, prov. Schensi).—*Earl E. Sherff*.

1695. BENNETT, A. *Helosciadium inundatum* L. (Koch) f. *fluitans* (Fr.) Prahl. Jour. Botany 57: 260. 1919.—A note on its publication, character, and occurrence near Holyhead.—*K. M. Wiegand*.

1696. BENNETT, A. *Utricularia*. Jour. Botany 57: 260. 1919.—A note on the occurrence of incorrect measurements in books regarding *U. vulgaris*, *U. major*, *U. intermedia* and *U. minor*.—*K. M. Wiegand*.

1697. BLAKE, S. F. The anay, a new edible-fruited relative of the avocado. Jour. Washington [D. C.] Acad. Sci. 9: 457-462. Fig. 1. 1919.—Two new species of the genus *Hufelandia*, both collected in Central America, are described. The fruit of one is somewhat similar to the avocado and it is believed that the tree can be grown in Florida. The fruit of the second is not known.—*Helen M. Gilkey*.

1698. BLAKE, S. T. A new salvia from Guatemala. Proc. Biol. Soc. Washington [D. C.] 32: 187-188. 1919.—*Salvia hempsteadiana* Blake is described as a new species from specimens collected in Guatemala by Mr. Wilson Popenoe, of the Bureau of Plant Industry. Its abundance of azure blue flowers gives promise of horticultural value.—*J. C. Gilman*.

1699. BLAKE, S. T. New plants from Sinaloa. Proc. Biol. Soc. Washington [D. C.] 32: 189-194. 1919.—*Polygala sinaloae* Blake, *Parsonsia blepharophylla* Blake, *Piptothrix sinaloae* Blake, *Perymenium stenophyllum* Blake, *Verbesina Ortegae* Blake, and *Otopappus Salazari* Blake are described as new species from the District of San Ignacio, Sinaloa, Mexico. They were collected by Señor A. E. Salazar under the direction of Señor J. G. Ortega, head of the Department of Agriculture, Department of Sinaloa and Nayarit.—*J. C. Gilman*.

1700. BÖDEKER, FRIEDRICH. *Echinocactus Joosseni* Böd. spec. nov. Monatsschr. für Kakteenkunde 28: 38-44. 1918.—Under the name given in the title the author describes and illustrates a new species of cactus which is a native of Paraguay or northern Argentina.—*J. M. Greenman*.

1701. BÖDEKER, FRIEDRICH. *Mamillaria erythrosperma* Böd. spec. nov. Monatsschr. für Kakteenkunde 28: 101-105. 1918.—The author describes and illustrates under the name given in the title a new species of cactus and designates a variety of it as var. *similis* De Laet. The species is a native of Mexico.—*J. M. Greenman*.

1702. BORNMÜLLER, JOS. Über den Formenkreis von *Cercis Siliquastrum* L. und *Cercis Griffithii* Boiss. [On forms of *Cercis Siliquastrum* L. and *Cercis Griffithii* Boiss.] Beih. Bot. Centralbl. 36⁴: 1-14. 1918.—The taxonomic characters of *Cercis Siliquastrum* L. and of *C. Griffithii* Boiss. are enumerated and contrasted. They relate mainly to (1) pubescence of fruits, peduncles and leaves, (2) form and size of fruits, as also the breadth of their winged margins and (3) the size of flowers. A tabulated summary with descriptions, of old and new varieties, subvarieties, forms, and subforms is presented for both species.—*Earl E. Sherff*.

1703. BORNMÜLLER, JOS. Über eine neue *Scutellaria* aus der Flora von Buchara. [On a new *Scutellaria* from Buchara.] Beih. Bot. Centralbl. 36^u: 60-61. 1918.—*Scutellaria Fedtschenkoi* Bornm. (Allg. Bot. Zeitschr., Jahrg. 1914: Nr. 1-2, S. 8, *nomen nudum*) is here given a Latin description. The species is native to Buchara, Prov. Baissun (type, *Bornmüller*, Plantae Turkestanicae 1150, Aug. 22, 1913, Hb. Bornmüller, also Hb. Petropol.).—*Earl E. Sherff.*

1704. BORNMÜLLER, J. Notizen zur Flora Oberfrankens, nebst einigen Bemerkungen über Bastarde und eine neue Form von *Polystichum Lonchitis* (L.) Roth in Alpengebiet. [Notes on the flora of Upper Franconia together with some observations on hybrids and a new form of *Polystichum Lonchitis* (L.) Roth in the Alpine region.] Beih. Bot. Centralbl. 36^u: 183-199. Pl. 1. 1918.—Various notes are given on the distribution, variation and occurrence of hybridity for certain spermatophytes and pteridophytes, chiefly of Upper Franconia. *Turritis glabra* L. f. *multicaulis*, *Crataegus Oxyacantha* L. var. *lagenariformis*, *Carduus nutans* L. var. *ortholepis*, *Polystichum* (*Dryopteris*) *Lonchitis* (L.) Roth f. *Reinecki* are described as new. The last two are illustrated (Pl. 1). Various hybrids in *Verbascum*, *Asplenium* and *Polystichum* are described and rather extended notes upon varying forms of *Sorbus* species and *Prenanthes purpurea* L. are given.—*Earl E. Sherff.*

1705. BORNMÜLLER, J. Revisions-Ergebnisse einiger orientalischer und zentralasiatischer Arten der Gattung *Echinops*. [Results of revisions of some oriental and central Asiatic species of the genus *Echinops*.] Beih. Bot. Centralbl. 36^u: 200-218. 1918.—No attempt is made to monograph the oriental species of *Echinops*. However, the author's more important results in a revision study of these species are presented. Under the section *Oligolepis* Bunge he describes 5 new species and 2 new varieties from Persia, namely, *Echinops lalesarensis* (J. Bornmüller, Iter Persico-turcicum 1892-93 no. 4055 pro parte, prov. Kerman) and var. *adenocaulis* (in consortio typi, no. 4055 pro parte, *E. elymaiticus* (central western Persia, types in Hb. Haussknecht and Hb. Bornmüller), *E. erioceras* (Th. Alexeenko no. 749, prov. Irak), *E. leiopolyceras* (J. Bornmüller, Iter Persicum no. 7325, in deserts between Teheran and Demawend, northern Persia, *E. ecbatanus* (Elwend, near Hamadan, northwestern Persia) and *E. ilicifolius* Bunge var. *glanduliger* (J. Bornmüller, Iter Persico-turcicum 1892-93 no. 4053, prov. Yesd, southeastern Persia). *Pleiacme* is introduced as a new section of the genus and under it one new species, *E. cervicornis* (J. Bornmüller, Iter Persico-turcicum 1892-93 no. 4054, Prov. Yesd, southeastern Persia) is described. Under the section *Ritrodes* Bunge is described *E. gedrosiaca* (J. Bornmüller, Iter Persico-turcicum 1892-93 no. 403, prov. Laristan, near the town Bender-Abbas, in the country once called Gedrosia; a single specimen) and the var. *macroseras* (C. B. Clarke 34787 E, Cheerkee, Hazaribagh, Chota Nagpore (?). Observations are given upon the species of *Echinops* (globe thistle, Kugeldistel) in the flora of the Himalayas, of Thibet and of Arabia. Two new species of the section *Oligolepis* Bunge are presented. These are *E. argyrocomus* (J. Bornmüller, Plantae Turkestanicae itin. B. A. Fedtschenko Samarkand, Turkestan) and *E. transcaspicus* (P. Sintenis, Iter Transcaspico persicum 1900-01 no. 688, Aschabad, Suluklii, Transcaspien region, at the Persian boundary).—*Earl E. Sherff.*

1706. BRIQUET, JOHN, AND FR. CAVILLIER. Notes sur quelques Phanérogames de l'Oberland bernois. [Notes on some Phanerogams of the Bernese Oberland.] Ann. Conserv. et Jard. Bot. Geneve 20: 222-261. Aug. 1, 1918.—This article consists of the enumeration of flowering plants of the Bernese Oberland and includes several new varieties and forms.—*J. M. Greenman.*

1707. BURGESS, J. L., AND C. H. WALDRON. Farm weeds of North Carolina and methods for their control. Bull. North. Carolina Dept. Agric. 40^s: 3-53. Illust. 1919.—See Bot. Absts. 3, Entry 1860.

1708. CAMUS, AIMÉE. Note sur une Graminée d'Indo-Chine: *Cymbopogon effusus* A. Camus. [Note on a grass of Indo-China.] Bull. Mus. Nat. Hist. Nat. Paris 24: 536-538. 1918.—The author transfers *Themeda effusa* Balansa (*Anthistiria Balansae* Crevost & Lemairé), a species from Tonkin, China, to *Cymbopogon*.—*J. M. Greenman.*

1709. CAMUS, AIMÉE. Note sur la genre *Iseilema* (Graminées). [Note on the genus *Iseilema* (Gramineae).] Bull. Mus. Nat. Hist. Nat. Paris 24: 539-541. 1918.—Six species of this genus occurring in the region of Indo-China and Australia are characterized. One of which, namely *Iseilema Thorelii* from Laos, is new to science.—J. M. Greenman.

1710. CHEVALIER, A. Premier inventaire des bois et autres produits forestiers du Tonkin. [First inventory of the timbers and other forest products of Tonkin.] Bull. Écon. Indochine 22: 495-540. 1919.—This is the third and concluding paper of the series, the two preceding ones having been published in the same periodical in 1918. The present paper contains a brief discussion of certain forest plants of economic importance, including a few bamboos, some palms, plants producing tanning materials, dyes, resins, oil, lacquer, benzoin, rubber, paper making materials, those with fragrant flowers and woods of commercial utility, cinnamon, tea, and other products of minor importance. *Thea Gilberti* A. Chev. and *T. Fleuryi* A. Chev. are proposed as new species. *Livistona saribas* (Lour.) Merr. appears as a new combination. *Liquidambar tonkinensis* A. Chev. is reduced to *L. formosana* Hance and *Dasilipa Pasquieri* Dubard is transferred to *Bassia* as *B. Pasquieri* Lecomte.—E. D. Merrill.

1711. CLOKEY, IRA W. *Carex* notes. Rhodora 21: 83-85. 1919.—Descriptions and type localities of three new *Carex*s, *Carex arapahoensis* spec. nov., *C. subimpressa* spec. nov., and *C. tribuloides* Wahl. var. *sangamonensis* var. nov.—James P. Poole.

1712. COCKERELL, T. D. A. *Helianthus Besseyi* Bates. Torreya 19: 197-198. 1919.—This species, originally published in 1914, is confirmed and redescribed from a study of specimens grown during the past season in the author's garden. The relationship between *H. Besseyi* and *H. apricus* Lunell is still a matter for investigation.—J. C. Nelson.

1713. COULTER, J. M. New African plants. [Rev. of: MOORE, SPENCER LEM. *Alabastra diversa*. Part XXIX. Jour. Bot. 56: 225-233. 1918. (See Bot. Absts. 1, Entry 1112.)] Bot. Gaz. 67: 184. Feb., 1919.

1714. COULTER, J. M. *Aquilegia*. [Rev. of: PAYSON, EDWIN BLAKE. The North American species of *Aquilegia*. Contrib. U. S. Nation. Herb. 20: 133-157. 7 pl. 1918. (See Bot. Absts. 1, Entry 1119.)] Bot. Gaz. 67: 184. Feb., 1919.

1715. COULTER, J. M. A new genus of Compositae. [Rev. of: PRITZEL, E. *Basedowia*, eine neue Gattung der Compositen aus Zentral-Australien. (Basedowia, a new genus of Compositae from Central Australia.) Ber. Deutsch. Bot. Ges. 36: 332-337. Pl. 12. 1918.] Bot. Gaz. 67: 280. 1919.

1716. COULTER, J. M. Tropical species of *Eupatorium*. [Rev. of: ROBINSON, B. L. I. Diagnoses and notes relating to tropical American Eupatorieae. II. A descriptive revision of the Colombian Eupatoriums. III. Keyed recensions of the Eupatoriums of Venezuela and Ecuador. Proc. Amer. Acad. Arts and Sci. 54: 235-267. 1918. (See Bot. Absts. 1, Entry 810.)] Bot. Gaz. 67: 280. 1919.

1717. COULTER, J. M. The orchids of Java. [Rev. of: SMITH, J. J. Die Orchideen von Java. (The orchids of Java.) Bull. Jard. Bot. Buitenzorg 26: 1-135. 1918. (See Bot. Absts. 2, Entry 370.)] Bot. Gaz. 67: 280. 1919.

1718. COULTER, J. M. *Selaginella*. [Rev. of: VAN ESELTINE, G. P. The allies of *Selaginella rupestris* in the southeastern United States. Contrib. U. S. Nation. Herb. 20: 159-172. 8 pl., 8 fig. 1918. (See Bot. Absts. 1, Entry 1439.)] Bot. Gaz. 67: 183. Feb., 1919.

1719. DAVIDSON, ANSTRUTHER. *Lupinus subhirsutus* n. sp. Bull. Southern California Acad. Sci. 18: 80. 1919.—The author describes as new, *Lupinus subhirsutus* from Palm Springs, California.—Roxana S. Ferris.

1720. DOWNES, H. *Juncus pygmaeus* Rich. Jour. Botany 57: 260. 1919.—A note on its occurrence in the Land's End and Lizard Districts of Cornwall.—K. M. Wiegand.

1721. ELMER, A. D. E. Zingiberaceae of the Sorsogon Peninsula. Leaflet Philippine Bot. 8: 2963-2995. 1919.—The following Philippine species are described as new: *Adelmeria al-bida*, *Alpinia congesta*, *A. longipetiolata*, *A. vulcanica*, *Amomum bulusauense*, *A. linearifolium*, *A. luzonense*, *Hornstedtia irosinensis*, *H. pcuinsula*, *H. purpurea*, *H. sorsogonensis*, *H. subvir-idis*, *Zingiber bulusanense*, and *Z. zerumbet* Sm. var. *magnum*. *Adelmeria gigantifolia* (*Zingiber gigantifolium* Elm.), *Amomum conoideum* (*Hornstedtia conoidea* Ridl.), *Hornstedtia pan-danicarpa* (*Amomum pandaniscarpum* Elm.) and *H. propinqua* (*Amomum propinquum* Ridl.), appear as new combinations. Notes are given on many other species.—E. D. Merrill.

1722. FARWELL, OLIVER ATKINS. *Bromelica* (Thurber): A new genus of grasses. *Rhodora* 21: 76-78. 1919.—The eastern species of Oat Grass have always been changed about with considerable uncertainty, being placed at different times in five different genera, namely, *Festuca*, *Bromus*, *Melica*, *Arena*, and *Trisetum*, and even today these species are listed under different genera in different manuals. The present author finds that they do not fit in exactly under any of these genera, but appear to be intermediate between *Bromus* and *Melica*, consequently he proposes, *Bromelica* (Thurber) n. gen. to include *B. striata* (Mx.) n. comb., *B. Smithii* (Porter) n. comb., *B. aristata* (Thurber) n. comb., *B. subulata* (Bong.) n. comb., *B. Harfordii* (Boland.) n. comb., *B. Harfordii* var. *minor* (Vasey) n. comb., *B. Geyeri* (Munro) n. comb., and *B. Geyeri* var. *Howellii* (Scribn.) n. comb. The synonymy of these species and varieties is given.—James P. Poole.

1723. FERNALD, M. L. *Carex flava*, var. *gaspensis* in Vermont. *Rhodora* 21: 40. 1919.—Characteristic sheet of this variety found in the herbarium of the late GEORGE G. KENNEDY, collected at Willoughby, Vermont in 1896. Apparently the first record from Vermont.—James P. Poole.

1724. FERNALD, M. L. *Helianthemum Bicknellii* and *H. propinquum*. *Rhodora* 21: 36-37. 1919.—Author proposes name *Helianthemum Bicknellii* nom. nov. for *H. majus* of present day manuals. BLAKE had recently taken up the name *H. propinquum* for BICKNELL's *H. majus*, but present author in study of flora of Cape Cod finds distinct specific differences between *H. propinquum* and *H. Bicknellii*.—James P. Poole.

1725. FERNALD, M. L. *Lomatogonium* the correct name for *Pleurogyne*. *Rhodora* 21: 193-198. 1919.—The writer has discovered that the name *Pleurogyne*, first given to the genus, so long known by that name, by Chamisso and Schlechtendal and later taken up by Grisebach who ascribed it to Eschscholtz, is clearly antedated by *Lomatogonium* first published by Alexander Braun. The bibliography of the genus and of the single North American species, *L. rotatum*, is given. Variations in the North American plants which have been distinguished as varieties, and in one case as a distinct species (*P. fontana* A. Nelson), are all designated as forms of *L. rotatum* because of the abundance of transitional specimens between these variations and the typical material. The bibliography of the Old World species is also given.—James P. Poole.

1726. FERNALD, M. L. *Nymphozanthus* the correct name for the cow lilies. *Rhodora* 21: 183-188. 1919.—The writer demonstrates that *Nymphozanthus*, as proposed by L. C. RICHARD for the cow lilies, antedates the prelinnean name *Nuphar* first published by SMITH. The article is concluded with the status of the generic names of these plants as it seems to be at present, and a list of the principal species of *Nymphozanthus*, chronologically arranged, with synonyms and citations of authorities.—James P. Poole.

1727. FULLER, GEORGE D. Winter botany. [Rev. of: TRELEASE, WILLIAM. Winter botany. 394 p., 327 fig. William Trelease: Urbana, 1918. (See Bot. Absts. 2, Entry 638.)] Bot. Gaz. 67: 173-174. Feb., 1919.

1728. GUERIN, PAUL. *L'Urea Humblotii* H. Baillon et ses affinités. [*Urea Humblotii* and its affinities.] *Compt. Rend. Acad. Sci. Paris* 168: 517-519. 1919.—*Urea Humblotii* was described in 1885 by H. BAILLON and was rediscovered in quantity by R. VIGNIER in the eastern part of Madagascar, where it is locally known as "Ampy." A comparison of the recent collections with those of BAILLON leads to the conclusion that *U. Humblotii* is merely a vigorous form of *U. longifolia* Wedd., another species from Madagascar, the two being strictly analogous in floral characters and identical in leaf anatomy. *U. Humblotii* also possesses in the cortex and occasionally in the pericycle a series of laticiferous tubes similar to *U. baccifera* Gaud., a South American form. This laticiferous system is analogous to that found in the Moraceae and Artocarpaceae, and is generally believed to be lacking in the Urticaceae.—*F. B. Wann.*

1729. HASSLER, E. *Aspicarpa, Gaudichaudia, Camarea, Janusia adjectis nonnullis notulis de Malpighiaceis paraguariensibus.* [*Aspicarpa, including Guadichaudia, Camarea, and Janusia with additional notes on the Malpighiaceae of Paraguay.*] *Ann. Conserv. et Jard. Bot. Genève* 20: 203-214. 30 May, 1918.—A synopsis is given of the species included under *Aspicarpa*. Several new combinations are made and critical notes are recorded concerning a number of the species enumerated.—*J. M. Greenman.*

1730. HENDERSON, MARGARET W. A comparative study of the structure and saprophytism of the Pyrolaceae and Monotropaceae with reference to their derivation from the Ericaceae. *Contrib. Univ. Pennsylvania Bot. Lab.* 5: 42-109. *Fig. 1-10.* 1919.—See Bot. Absts. 3, Entry 2434.

1731. HITCHCOCK, A. S., AND PAUL C. STANDLEY. *Flora of the District of Columbia and vicinity.* *Contrib. U. S. Nation. Herb.* 21: 1-329. *Pl. 1-42, fig. 1.* 1919.—This work, which has been prepared with the assistance of many of the botanists of Washington, replaces Ward's *Flora* of 1881 and its six supplements. There is a short general account of the region, two keys to families, one chiefly by leaves, the other by floral characters, an annotated list of the species, and a glossary. Keys to the genera and species are given under their appropriate headings; and 1630 species are formally listed in the work, 287 of which are introduced, and 108 others, known only as waifs, are incidentally mentioned. The illustrations represent localities of interest about Washington and some of the characteristic flowers of the region.—*S. F. Blake.*

1732. JOHNSTON, I. M. *Contributions on Southern California botany.* *Bull. Southern California Acad. Sci.* 18: 18-21. 1919.—With notes on various Southern California plants, the author describes the following species and varieties as new to science: *Monardella saxicola*, *M. lanceolata* Gray var. *glandulifera*, and *Corethrogyne filanginifolia* (H. & A.) Nutt. var. *pinetorum*.—*Roxana S. Ferris.*

1733. KNOWLTON, C. H., AND WALTER DEANE. *Reports on the flora of the Boston district, XXX.* *Rhodora* 21: 78-83. 1919.—See Bot. Absts. 4, Entry 342.

1734. KOIDZUMI, GENITI. *Contributiones ad floram Asiae orientalis.* *Bot. Mag. Tôkyô* 33: 110-129. 1919.—Continued from Volume 22, and to be concluded in future numbers. Contains new species and varieties in the following genera. *Aconitum* 1, *Angelica* 1, *Aster* 1, *Cirsium* 4, *Claoxylon* 1, *Corydalis* 1, *Disporum* 1, *Euphorbia* 1, *Jasminum* 1, *Lypsimachia* 1, *Pennisetum* 1, *Pisonia* 1, *Platanthera* 1, *Polygonatum* 4, *Pyrus* 13, *Salix* 2, *Wichstroemia* 1.—*L. R. Abrams.*

1735. KOORDERS, S. H., AND TH. VALETON. *Atlas der Baumarten von Java im anschluss an die "Bijdragen tot de Kennis der Boomsoorten van Java."* [Atlas of Javanese trees, an appendix to "Contributions to our knowledge of the tree of species of Java."]—Vol. 1, *Pl. 1-200.* 1913; Vol. 2, *Pl. 201-400.* 1913-14; Vol. 3, *Pl. 401-600.* 1914-15; Vol. 4, *Pl. 601-800, Index and errata,* 1916-18. F. P. W. M. Trap, Leiden.—This work, as the title indicates, presents

figures of Javan tree species illustrating about as many species as there are plates (800), previously described in the "Bijdragen tot de Kennis der Boomsoorten van Java." [Contributions to a knowledge of the tree species of Java.] Vols. 1-12, 1894-1910. The Atlas was issued in 16 parts of 50 plates each, forming four volumes. Descriptions are not given in the work under consideration, but references are included to the text of the "Boomsoorten" and to other literature, with the addition of the local names and explanations of the figures.—*E. D. Merrill.*

1736. KOORDERS, S. H. Flora von Tjibodas umfassend die Blütenpflanzen welche in der botanischen Tjibodas-Waldreserve und oberhalb derselben auf den West-Javanischen Vulkanen Pangerango und Gede wildwachsend vorkommen. [Flora of Tjibodas, Java.] Visser & Co., Batavia, Java. 1918-1919.—This publication, in the form of manual, with keys to and descriptions of the genera and species, is to be issued in three volumes, of which the following have appeared: Vol. 1, part 1, pp. 1-54, introductory; Vol. 1, part 3, pp. 1-128, Orchidaceae; Vol. 3, part 1, pp. 1-44, Ericaceae to Plantaginaceae; and Vol. 3, part 2, pp. 1-87, Rubiaceae to Compositae.—*E. D. Merrill.*

1737. KOORDERS, S. H. Supplement op het Eerste Overzicht der Flora van N. O. Celebes. [Supplement to the first review of the flora of north-eastern Celebes.] P. 1-30. Pl. 1-10. 1918. Visser & Co., Batavia, Java.—The following species are described and figured in detail amplifying the brief original descriptions: *Wallaceodendron celebicum* Kds., *Couthovia celebica* Kds., *Gleditschia Rolfei* Vidal, *Albizia minahassae* Kds., *Polythyrsis Stapfi* Kds., *Cyrtandra hypogaea* Kds., *Spiraeopsis celebica* Miq., *Reinwardtiendendron celebicum* Kds., *Diospyros utilis* Kds. & Val., and *Sloanea celebica* Boerl. & Kds.—*E. D. Merrill.*

1738. LACAITA, C. Piante Italiane critiche o rare. [Critical or rare plants of Italy.] Nuovo Gior. Bot. Ital. 25: 193-223. 1918.—The author continues his enumeration of critical or rare plants of Italy with copious notes and includes the description of a new species of *Thymus*, namely *T. sacer*, from the Province of Salerno.—*J. M. Greenman.*

1739. LACAITA, C. C. Two critical plants of the Greek flora. Jour. Linn. Soc. London 44: 125-129. 1918.—The author confirms Čelakovsky's reduction of *Thymus lanceolatus* Sibth. & Sm., not Desf., and *T. heterotrichus* Griseb. to *T. Sibthorpii* Benth. A new species of *Crepis* is described, namely *C. rutilans*, from the Island of Corfu.—*J. M. Greenman.*

1740. LECOMTE, NENRI. Une espèce Indo-Chinoise du genre *Sarcosperma*, de la famille Sapotacées. [A species of the genus *Sarcosperma* of the family Sapotaceae from Indo-China.] Bull. Mus. Nat. Hist. Nat. Paris 24: 534, 535. 1918.—*Sarcosperma tonkinensis* is described as a new species from Tonkin, China.—*J. M. Greenman.*

1741. LÉON, BROTHER. A new Cuban *Sida*. Torreya 19: 172-173. 1919.—*Sida Brittoni* Fr. Léon is described, the type from Chirigota, Pinar del Rio, Cuba. This species has been referred to *S. ciliaris* L., but is shown to be clearly distinct.—*J. C. Nelson.*

1742. LIND, J. Apoteker C Heerfordts Herbarier. [The herbarium of the chemist. C. Heerfordt.] Bot. Tidsskr. 36: 1-19. 1917.—Although this herbarium is 260 years old, the various plants are as well preserved as if they had been only mounted a year ago. This herbarium consists principally of herbaceous forms, many being medicinal plants.—*A. L. Bakke.*

1743. MACBRIDE, J. FRANCIS. I. Notes on certain Leguminosae. II. Reclassified or new Spermatophytes, chiefly North American. Contrib. Gray Herb. Harvard Univ. New Ser. 59: 1-39. 1919.—The following new combinations, with the name-bearing synonym in parentheses, new names and species new to science are included: *Inga vera* Willd. var. *lamprophylla* (*Inga vera* Willd. subsp. *lamprophylla* Pittier), *I. vera* Willd. var. *portoricensis* (*I. vera* Willd. subsp. *portoricensis* Pittier), *Enterolobium gummiferum* (*Pithecolobium gummiferum* Mart.), *Samanea flexicaulis* (*Acacia flexicaulis* Benth.), *S. Schaffneri* (*Pithecolobium Schaffneri* Wats.), *Pithecolobium mangense* (*Mimosa mangensis* Jacq.), *P. cochliocarpum*

(*Mimosa cochliocarpus* Gomez), *P. heterophyllum* (*Mimosa heterophylla* Roxb.), *P. heterophyllum* (Roxb.) Macbr. var. *intermedium* (*P. angulatum* Benth. var. *intermedia* Prain), *Albizia distachya* (*Mimosa distachya* Vent.), *A. Zygia* (*Inga Zygia* DC.), *A. microphylla* (*Mimosa microphylla* Roxb.), *A. sassa* (*Inga sassa* Willd.), *Calliandra formosa* (Kunth) Benth. var. *gracilis* (*C. gracilis* Klotzsch), *C. formosa* (Kunth) Benth. var. *cubensis*, *C. uninjuga* Rose var. *pueblensis*, *C. anomala* (*Inga anomala* Kunth), *C. anomala* (Kunth) Macbr. var. *Callistemon* (*Acacia Callistemon* Schlecht.), *C. Selloi* (*Acacia Selloi* Spreng.), *C. hirsuta* (G. Don) Benth. var. *Sancti-Pauli* (*C. Sancti-Pauli* Hassk.), *C. haematomma* (Bert.) Benth. var. *pubescens* (*C. haematostoma* Urb. var. *pubescens* Urb.), *C. haematomma* (Bert.) Benth. var. *minutifolia* (*C. haematostoma* Urb. var. *minutifolia* Urb.), *Lytiloma divaricata* (*Mimosa divaricata* Jacq.), *Acacia Bilimekii*, *A. aculeatissima*, *A. paniculata* (*Mimosa paniculata* Wendl.), *A. terminalis* (*Mimosa terminalis* Salisb.), *A. binervia* (*Mimosa binervia* Wendl.), *A. caesia* (L.) Willd. var. *oxyphylla* (*A. Intsia* (L.) Willd. var. *oxyphylla* Grah.), *A. simplicifolia* (*Mimosa simplicifolia* L. f.), *A. linearis* (*Mimosa linearis* Wendl.), *A. ciliata* R. Br. var. *brevifolia* (*A. strigosa* Link, var. *brevifolia* Meissn.), *A. ciliata* R. Br. var. *intermedia* (*A. strigosa* Link, var. *intermedia* E. Pritzl), *A. undulaefolia* Fraser, var. *piligera* (*A. piligera* A. Cunn.), *A. pulchella* R. Br. var. *fagonioides* (*A. fagonioides* Benth.), *Schrankia microphylla* (*Mimosa microphylla* Dryand.), *S. quadrivalvis* (L.) Merrill, var. *jaliscensis*, *S. pilosa* (*Morrongia pilosa* Standley), *Mimosa aculeaticarpa* Ort. var. *desmanthocarpa* (*M. acanthocarpa* (Willd.) Benth. var. *desmanthocarpa* Robinson), *M. aculeaticarpa* Ort. var. *imparilis*, *M. Standleyi*, *M. Benthami*, *M. Benthami* Macbr. var. *malacocarpa* (*M. fasciculata* (Kunth) Benth. var. *malacocarpa* Robinson), *M. bimucronata* (DC.) Ktze. var. *hexandra* (*M. hexandra* Micheli), *M. leprosa* (*M. calodendron* Mart. var. *leprosa* Bong.), *M. globosa* (*Prosopis globosa* Gillies), *M. incana* (Spreng.) Benth. var. *robusta*, *M. macrostachya* (*Schrankia macrostachya* Benth.), *M. macrostachya* Benth. Macbr. var. *glaberrima* (*M. millefoliata* Scheele, var. *glaberrima* Chod. & Hassl.), *M. paraguayae* Micheli, var. *induta* (*M. paraguayae* Micheli, var. *genuina* Hassl. forma *induta* Hassl.), *M. Herzogii*, *Desmanthus illinoensis* (Michx.) MacM. var. *glandulosus* (*Mimosa glandulosa* Michx.), *D. pumilus* (*Mimosa pumila* Schlecht.), *D. hexapetalus* (*Neptunia hexapetala* Micheli), *Cailliea glomerata* (*Mimosa glomerata* Forsk.), *C. cinerea* (*Mimosa cinerea* L.), *C. platycarpa* (*Dichrostachys platycarpa* Welw.), *C. spicata* (*Neptunia spicata* Muell), *C. tenuifolia* (*Dichrostachys tenuifolia* Benth.), *Prosopis cineraria* (*Mimosa cineraria* L.), *P. farcta* (*Mimosa farcta* Russell), *Piptadenia gonocantha* (*Acacia gonocantha* Mart.), *P. fruticosa* (*Acacia fruticosa* Mart.), *P. adiantoides* (*Acacia adiantoides* Spreng.), *P. grata* (*Acacia grata* Willd.), *P. obliqua* (*Sophora obliqua* Pers.), *P. platycarpa* (*Goldmania platycarpa* Rose), *P. constricta* (*Goldmania constricta* Micheli & Rose), *Elephantorrhiza elephantina* (Burch.) Skeels, var. *Burkei* (*E. Burkei* Benth.), *Entada spicata* (*Mimosa spicata* E. Mey.), *Parkia Oliveri*, *P. pedunculata* (*Mimosa pedunculata* Roxb.), *P. arborea* (*Paryphosphaera arborea* Karst.), *Cynometra phaselocarpa* (*Vouapa phaselocarpa* Hayne), *C. Martiana* (*Trachylobium Martianum* Hayne), *C. Martiana* (Hayne) Macbr. var. *procera* (*C. Spruceana* Benth. var. *procera* Benth.), *Crudia glaberrima* (*Hirtella glaberrima* Steud.), *C. tomentosa* (*Parivoa tomentosa* Aubl.), *Westia auriculata* (*Berlinia auriculata* Benth.), *W. bracteosa* (*Berlinia bracteosa* Benth.), *W. Eminii* (*Berlinia Eminii* Taub.), *W. paniculata* (*Berlinia paniculata* Benth.), *W. stipulacea* (*Berlinia stipulacea* Benth.), *W. angolensis* (*Berlinia angolensis* Welw.), *W. bifoliolata* (*Berlinia bifoliolata* Harms), *W. Sheffleri* (*Berlinia Sheffleri* Harms), *W. tomentosa* (*Berlinia tomentosa* Harms), *Macrolobium macrophyllum* (*Anthonotha macrophylla* Beauv.), *Bauhinia microstachya* (*Schnella microstachya* Raddi), *B. microstachya* (Raddi) Macbr. var. *bahiensis* (*B. bahiensis* Bong.), *B. bauhinioides* (*Perlebia bauhinioides* Mart.), *B. vestita* (*Schnella vestita* Benth.), *B. anamesa*, *B. Coulteri*, *B. Horsfieldii* (*Lasiobema Horsfieldii* Miq.), *B. Wallichii*, *Apuleja leiocarpa* (*Leptolobium* ? *leiocarpum* Vogel), *Cassia keyensis* (*Chamaecrista keyensis* Pennell), *C. brachiata* (*Chamaecrista brachiata* Pollard), *C. Deeringiana* (*Chamaecrista Deeringiana* Small & Pennell) *C. fasciculata* Michx. var. *robusta* (*C. Chamaecrista* L. var. *robusta* Pollard), *C. fasciculata* Michx. var. *depressa* (*C. depressa* Pollard), *C. fasciculata* Michx. var. *Tracyi* (*Chamaecrista Tracyi* Pollard), *C. fasciculata* Michx. var. *littoralis* (*Chamaecrista littoralis* Pollard), *C. fasciculata* Michx. var. *puberula* (*Chamaecrista puberula* Greene), *C. nictitans* L.

var. *multipinnata* (*C. multipinnata* Pollard), *C. nictitans* L. var. *Mohrii* (*C. aspera* Muhl. var. *Mohrii* Pollard), *C. aspera* Muhl. var. *Simpsoni* (*C. Simpsoni* Pollard), *C. savannarum* (*Chamaecrista savannarum* Britton), *C. granulata* (*C. portoricensis* Urb. var. *granulata* Urb.), *C. pinetorum* (*Chamaecrista pinetorum* Britton), *C. Tuerckheimii* (*Chamaecrista Tuerckheimii* Britton), *C. glandulosa* L. var. *Swartzii* (*C. Swartzii* Wickstr.), *C. bauhinioides* Gray var. *pilosior* Robinson, *C. bauhinioides* Gray var. *arizonica* Robinson, *Calochortus barbatus* (HBK.) Painter, var. *chihuahuensis* (*C. barbatus* (HBK.) Painter, subsp. *chihuahuensis* Painter), *Cryptocarya Bowiei* (*Laurus Bowiei* Hook.), *Sanicula Peckiana*, *Tauschia Kelloggii* (*Deweya Kelloggii* Gray), *Viticella aurita* (*Nemophila aurita* Lindl.), *V. racemosa* (*Nemophila racemosa* Nutt.), *V. phacelioides* (*Nemophila phacelioides* Nutt.), *V. maculata* (*Nemophila maculata* Benth.), *V. Menziesii* (*Nemophila Menziesii* H. & A.), *V. Menziesii* (H. & A.) Macbr. var. *liniflora* (*Nemophila liniflora* F. & M.), *V. Menziesii* (H. & A.) Macbr. var. *atomaria* (*Nemophila atomaria* (F. & M.), *V. Menziesii* (H. & A.) Macbr. var. *integrifolia* (*Nemophila Menziesii* H. & A. var. *integrifolia* Parish), *V. Menziesii* (H. & A.) Macbr. var. *rotata* (*Nemophila rotata* Eastw.), *V. Kirtleyi* (*Nemophila Kirtleyi* Henderson), *V. pulchella* (*Nemophila pulchella* Eastw.), *V. heterophylla* (*Nemophila heterophylla* F. & M.), *V. heterophylla* (F. & M.) Macbr. var. *flaccida* (*Nemophila flaccida* Eastw.), *V. heterophylla* (F. & M.) Macbr. var. *tenera* (Eastw.) Nels. & Macbr. (*Nemophila tenera* Eastw.), *V. exilis* (*Nemophila exilis* Eastw.), *V. parviflora* (*Nemophila parviflora* Dougl.), *V. parviflora* (Dougl.) Macbr. var. *Austinae* (Eastw.) Nels. & Macbr. (*Nemophila Austinae* Eastw.), *V. parviflora* (Dougl.) Macbr. var. *Plaskettii* (*Nemophila Plaskettii* Eastw.), *V. pedunculata* (*Nemophila pedunculata* Dougl.), *V. pedunculata* (Dougl.) Macbr. var. *sepulta* (Parish) Nels. & Macbr. (*Nemophila sepulta* Parish), *V. pedunculata* (Dougl.) Macbr. var. *densa* (Howell) Nels. & Macbr. (*Nemophila densa* Howell), *V. breviflora* (*Nemophila breviflora* Gray), *V. spatulata* (*Nemophila spatulata* Coville), *V. humilis* (*Nemophila humilis* Eastw.), *Phacelia dasyphylla* Greene, var. *ophitidis*, *Allocarya mexicana*, *Cordylanthus tenuis* Gray, var. *viscidus* (*Adenostegia viscida* Howell), *C. Hansenii* (*Adenostegia Hansenii* Ferris), *C. littoralis* (*Adenostegia littoralis* Ferris), *C. ramosus* Nutt. var. *puberulus*, *C. Helleri* (*Adenostegia Helleri* Ferris), *C. palmatus* (*Adenostegia palmata* Ferris), *Eriophyllum confertifolium* (DC.) Gray, var. *artemisiaefolium* (*Bahia artemisiaefolia* Less.).—E. B. Payson.

1744. MARSHALL, E. S. *Verbascum thapsiforme* as a British plant. Jour. Botany 57: 257-258. 1919.—This species was found by W. D. MILLER and the writer in a botanically rich region near Holford, v. c. 5 S. Somerset. All previous records of the occurrence in the British Isles are apparently unfounded. It is similar to *V. Thapsus*, and is a close relative of *V. phlomoides* L. with which the writer would write it as var. (or subsp.) *thapsiforme* Coste. Schrader's original description of *V. thapsiforme* is given. The plant is considered native in the place where found.—K. M. Wiegand.

1745. MATSUDA, SADAHISA. A list of plants collected by I. Yamazuta on Mt. Omei. Bot. Mag. Tôkyô 33: 130-137, 143-152. 1919.—Mt. Omei is one of the famous mountains of China, and is situated about 193° 41' E. long. and 29° 32' N. lat. and rises to a height of 11,000 feet above sea level. Thirty-four genera and 76 species of spermatophytes, and 2 genera and 3 species of pteridophytes are listed. The new species and varieties are: *Rubus chirosepalus* var. *omeiensis*, *Aster yamazutae*, and *Trigonotis omeiensis*.—L. R. Abrams.

1746. MEYER, RUDOLF. *Echinopsis Mieckleyi* R. Mey. Monatschr. für Kakteenkunde 28: 122-124. 1918.—The new species here published appears to be native of South America having been originally imported along with other cactus material from Bolivia.—J. M. Greenman.

1747. MONCKTON, HORACE W. The flora of the Bagshot District. Jour. Botany 57: 251-257. 1919.—The author has made a practice of noting the plants which he has seen growing on various geological formations, and has attempted to make complete lists of the flora of certain selected geological areas. The district of the Bagshot Sands, on and around the Bagshot Heaths (in England), is the area taken for the present report. It is 24 by 11 miles

in extent and is of a single geological formation. The surface is of sand and gravel with subordinate beds of clay or sandy clay, and there is an absence of lime in the area. A note on the flora of this region has already been published by the author (Proc. Linn. Soc. p. 5, 1915-1916: see Jour. Bot. p. 94, 1916). Eight hundred fifty-four entries in the list have now been made. The present paper contains a discussion of the occurrence of various plants (20-30) from this list, and a comparison with the occurrence elsewhere. A list of the species of *Sphagnum* found in the district is given and the various stations are cited.—K. M. Wiegand.

1748. MOORE, SPENCER LE M. *Alabastra Diversa*.—Part XXXI. Jour. Botany 57: 244-251. 1919.—1. *Miscellanea Africana*. (concluded from p. 219). Only new species are treated. In this installment the following are described as new: *Buchnera Kassneri*, Belgian Congo; *Rhaphicarpa Elliotii*, East Africa; *Streptocarpus Eylesii*, Rhodesia; *Justicia* (§ *Harniera*) *Dinteri*, Southwest Africa; *Dicliptera Batesii*, South Cameroons; *Lippia Gossweileri*, Angola; *Clerodendron lupakense*, *C. bingaense*, *C. frutectorum*, and *C. consors*, Belgian Congo; *Loranthus* (§ *Erectilobi*) *Batesii* Moore & Sprague, Cameroons; *Acalypha eriophylloides*, Angola; *A. Gossweileri*, Angola. 2. *Monimiaceae Nova Brasiliensis*. *Mollinedia* (§ *Inappendiculata*) *Cunninghamii*, from Rio Janeiro, is described as new. [See also Bot. Absts. 3, Entry 3003.] —K. M. Wiegand.

1749. NELSON, JAMES C. Notes on the grasses of Howell's flora of Northwest America. *Torreyia* 19: 187-193. 1919.—Howell's Flora, although a work of great merit in view of the author's limitations, is now in great need of revision. One hundred and thirty-eight changes affecting the nomenclature of the Gramineae are noted, grouped as follows: (1) Species not included which have since been found in various localities in Oregon, 43; (2) species whose existence in the territory is not confirmed, 10; (3) species whose taxonomic limits are now generally understood differently, 83.—J. C. Nelson.

1750. NELSON, J. C. *Oregon Chenopodiums*. *Amer. Bot.* 25: 112. 1919.

1751. NELSON, J. C. *Deam's trees of Indiana*. [Rev. of: DEAM, CHAS. C. *The trees of Indiana*. State Bd. Forest. Indiana Bull. 3. 299 p. March, 1919.] *Rhodora* 21: 188-191. 1919.—See Bot. Absts. 4, Entry 454.

1752. NORDBERG, ARNE. *Ny fyndort for Cypridium*. [A new locality for *Cypridium*.] *Bot. Notiser* 1919: 167. 1919.—See Bot. Absts. 4, Entry 358.

1753. PAMMEL, L. H. *The willows and poplars of Iowa*. Rept. Iowa State Hort. Soc. 53: 163-173. 12 pl. 1918.—The author gives a key to the poplars and willows of Iowa. (The key for willows is supplied by C. R. BALL, and is based on foliage character and distribution of the same in the state.) The following willows are recorded for Iowa: *Salix lucida*, *S. pentandra*, *S. alba*, *S. fragilis*, *S. babylonica*, *S. amygdaloides*, *S. nigra*, *S. interior*, *S. cordata*, *S. missouriensis*, *S. pedicellaris hypoglauca*, *S. candida*, *S. petiolaris*, *S. sericea*, *S. discolor*, *S. eriocephala*, *S. humilis*, *S. tristis*, *S. Bebbiana*. Of the species listed *S. pentandra*, *S. fragilis*, *S. babylonica*, and *S. alba* are frequently cultivated. The *S. alba* is a frequent escape. The following poplars are native or naturalized: *Populus alba*, *P. canadensis*, *P. balsamifera*, *P. nigra dilatata*, *P. deltoides*, *P. grandidentata* and *P. tremuloides*.—L. H. Pammel.

1754. PAMMEL, L. H. *Some notes on plants of the proposed Mississippi Valley national park*. Rept. Iowa State Hort. Soc. 53: 379-382. 1918.—A list of the common trees, shrubs and other plants found in the region. Of the rarer trees of Iowa mention is made of *Frazinus americana*, *Quercus acuminata*, *Betula lutea* and *B. papyrifera*.—L. H. Pammel.

1755. PITTIER, H. *On the origin of chicle with descriptions of two new species of Achras*. Jour. Washington [D. C.] Acad. Sci. 9: 431-438. 1919.—It has been commonly reported that the sole producer of chicle, the base of American chewing gum, is *Achras Zapota* L., an important fruit tree of Central and South America; but the author recently discovered, during an official exploration through Central America, that chicle is not extracted exclusively, if at

all, from *A. Zapota*, but from other species of the genus and from other genera of the same family, Sapotaceae. Under the genus *Achras*, which has previously been considered monotypic, two new species are described.—*Helen M. Gilkey*.

1756. PUGSLEY, H. W. A revision of the genera *Fumaria* and *Rupicapnos*. Jour. Linn. Soc. Bot. London 44: 233-355. Pl. 9-16. 1919.—A critical revision of all species of *Fumaria* and *Rupicapnos*, with a general discussion of the distribution and habitats of the genera as a whole. A few notes on soil preference are given. In *Fumaria* 7 new species and 18 new varieties are described, and in *Rupicapnos*, 7 new species and 2 new varieties.—*A. J. Eames*.

1757. PURPUS, J. A. *Phyllocactus* (*Epiphyllum*) *chiapensis* J. A. Purp. spec. nov. Monatsschr. für Kakteenkunde 28: 118-121. 1918.—*Phyllocactus chiapensis* is described and illustrated as new to science from specimens collected by C. A. Purpus in the state of Chiapas, Mexico, in 1913.—*J. M. Greenman*.

1758. REHDER, ALFRED. New species, varieties and combinations from the herbarium and the collections of the Arnold Arboretum. Jour. Arnold Arboretum 1: 44-60. July, 1919.—After an introduction discussing some doubtful points of nomenclature chiefly as regards articles 45, 47 and 50 of the International rules and the nomenclature of varieties and hybrids, a systematic enumeration of new species and new combinations is given. *Taxus chinensis* (Pilger) and *Carpinus Handelii* are new species from China, *Larix Henryana* is a new name for a hybrid between *L. decidua* and *L. Kaempferi*. The following are new combinations: *Pseudolarix amabilis* (J. Nelson), *Abies spectabilis* var. *brevifolia* (A. Henry), *Sasa Veitchii* (Carr.), *S. Veitchii* f. *minor* (Makino), *S. senanensis* (French. & Sav.), *S. senanensis* f. *nebulosa* (Makino) and *S. senanensis* var. *stenantha* (Makino). Besides these many new combinations of horticultural forms and varieties appear under the following species: *Cupressus lusitanica*, *Chamaecyparis obtusa*, *Abies homolepis*, \times *A. insignis*, *A. alba*, *A. lasiocarpa*, *Picea Abies*, *P. glauca*, *Betula pendula*. For the Chinese *Carya cathayensis* a new station is recorded. [See also next following Entry, 1759].—*Alfred Rehder*.

1759. REHDER, ALFRED. New species, varieties and combinations from the herbarium and the collections of the Arnold Arboretum. Jour. Arnold Arboretum 1: 121-146. 1919.—The present article contains new combinations and some new names in the genera *Castanopsis*, *Lithocarpus*, *Quercus*, *Ulmus*, *Calycanthus* and *Benzoin*, critical notes on *Quercus dentata*, *Zelkova serrata*, *Litsea sericea* and on the nomenclature of *Ulmus procera*, a new horticultural form and a new binomial for a garden hybrid of *Mahonia*, and the following new varieties and forms: *Quercus aliena* var. *pubipes*, *Ulmus laciniata* var. *nikkoensis*, *U. pumila* var. *pilosa*, *Morus mongolica* var. *vestita* and *Umbellularia californica* f. *pendula*. [See also next preceding Entry, 1758].—*Alfred Rehder*.

1760. REHDER, ALFRED, AND E. H. WILSON. New woody plants from the Bonin Islands. Jour. Arnold Arboretum 1: 115-121. 1919.—The following species and one variety are described as new to science: *Cyphokentia Savoryana*, *Ficus Iidaiana*, *Evodia Kumagaiana*, *Symplocos Otomoi*, *S. boninensis* and *Zanthoxylum ailanthoides* var. *inerme*. A new combination is *Calpidia Nishimurae* (*Pisonia Nishimurae* Koidzumi).—*Alfred Rehder*.

1761. ROBINSON, B. L. An unusual *Daucus Carota*. Rhodora 21: 70-71. 1919.—Description of an unusual specimen of this species in which nearly half of the compound umbel has petals of a rich, deep violet shade.—*James P. Poole*.

1762. ROBINSON, B. L. I. On tropical American Compositae, chiefly Eupatorieae. [Contrib. Gray Herb. Harvard Univ. New Ser. 60: 1-88.] Proc. Amer. Acad. Arts and Sci. 55: 3-41. 1919.—The following species, varieties and forms new to science are characterized: *Ophrysoporus bipinnatifidus*, *O. ovatus*, *Eupatorium anisodontum*, *E. Aristei*, *E. Bridgesii*, *E. choriscephaloides*, *E. coelocaulis*, *E. Cookii*, *E. dasyneuron*, *E. drepanoides*, *E. endytum*, *E. eripsioides*, *E. flexile*, *E. Gascae*, *E. Gilbertii*, *E. gloeocladum*, *E. gracilentum*, *E. hylophilum*, *E.*

hypargyrum, *E. iodotrichum*, *E. iresinoides* HBK. var. *adenotrichum*, *E. isillumense*, *E. lobatum*, *E. mallotum*, *E. mallotum* Robinson var. ? *aporum*, *E. Mathewsii*, *E. metense*, *E. orgyaloides*, *E. Pachanoi*, *E. phoenicticum*, *E. pseudodalea* (DC.) Gomez & Molt. var. *typicum*, *E. pseudodalea* (DC.) Gomez & Molt. var. *apodophyllum*, *E. pseudo-dalea* (DC.) Gomez & Molt. var. *macrodonum*, *E. psilodorum*, *E. rhyppodes*, *E. Roseorum*, *E. roupalifolium*, *E. simulans*, *E. solidaginoides* HBK. var. *Armourii*, *E. Sprucei*, *E. squalidum* DC. var. *Rusbyanum*, *E. Steetzii*, *E. stictophyllum*, *E. tarapotense*, *E. uber*, *E. urubambense*, *E. vallincola* DC. var. *typicum*, *E. vallincola* DC. var. *brevipilum*, *Brickellia* ? *Arsenei*, *Calea caracasana* (HBK.) Ktze. var. *pilosior* Ktze. forma *discoidea*. II. A Recension of the *Eupatoriums* of Peru. *Ibid.* 42-88. The author gives keys to the 82 species known to occur in Peru. Exsiccatae and synonyms are cited and many diagnoses and critical notes are given. The following new combinations (with the name-bearing synonym in parentheses) are made: *Eupatorium exserto-venosum* Klatt, var. *crenatum* (*E. pseudofastigiatum* var. *crenata* Hieron.), *E. exserto-venosum* Klatt, var. *crenato-dentatum* (*E. pseudofastigiatum* var. *crenato-dentata* Hieron.), *E. exserto-venosum* Klatt, var. *lanceolatum* (*E. pseudofastigiatum* var. *lanceolatum* Hieron.), *E. kleinoides* HBK. var. *typicum* (*E. kleinoides* forma *typica* Hieron.), *Helogyne straminea* (*Eupatorium stramineum* DC.).—*E. B. Payson.*

1763. ROCK, J. F. The arborescent indigenous legumes of Hawaii. Hawaii Bd. Agric. and Forest. Div. Forest. Bot. Bull. 5. 53 p. Pl. 1-18. 1919.—The author gives botanical descriptions and notes on various species and varieties of indigenous Hawaiian legumes included under the following genera: *Acacia*, *Mezoneurum*, *Sophora*, and *Erythrina*.—*J. M. Westgate.*

1764. ROCK, J. F. The Hawaiian genus *Kokia*, a relative of the cotton. Hawaii Bd. Agric. and Forest. Div. Forest. Bot. Bull. 6. 22 p. Pl. 1-7. 1919.—Botanical and historical notes are given concerning *Kokia lanceolata*, *K. Rockii*, and *K. Rockii* var. *kauaiensis* n. var., together with a description of measures looking to the preservation to science of these rare trees because of their possible importance in relation to the solution of cotton-breeding problems.—*J. M. Westgate.*

1765. RUSSELL, ALICE M. A comparative study of *Floerkea proserpinacoides* and allies. Contrib. Univ. Pennsylvania Bot. Lab. 4: 401-418. Pl. 91-92. 1919.—See Bot. Absts. 3, Entry 2444.

1766. SARGENT, C. S. Notes on North American trees. V. Jour. Arnold Arboretum 1: 61-65. July, 1919.—The present article deals with *Populus* and *Betula*. The author adopts *Populus tacamahaca* Mill. for *P. balsamifera* of authors, not Linnaeus, and *P. balsamifera* L. for *P. deltoidea* var. *missouriensis* Henry (*P. angulata* Michx.) with the variety *P. balsamifera* var. *virginiana* (Castiglioni) for *P. deltoidea* Marsh. Besides the last named the following varieties and combinations are published as new: *Populus acuminata* var. *Rehderi*, *P. Fremontii* var. *macrodisca*, *P. balsamifera* f. *pilosa*, *Betula papyrifera* var. *globata* (Fernal!), *B. papyrifera* var. *occidentalis* (Hook.), *B. papyrifera* var. *subcordata* (Rydberg), *B. papyrifera* var. *montanensis* (Butler), *B. fontinalis* var. *Piperi* (Britton).—*Alfred Rehder.*

1767. SCHLECHTER, R. Versuch einer natürlichen Neuordnung der afrikanischen angraekoiden Orchidaceen. [A proposed natural new arrangement of the African angraekoid Orchidaceae.] Beih. Bot. Centralbl. 35^H: 62-181. 1918.—The African angraekoid orchids are arranged in 32 genera. Of these, 12 are new: *Rhipidoglossum*, *Podangis*, *Phormangis*, *Sarcorrhynchus*, *Bolusiella*, *Chamaeangis*, *Solenangis*, *Eurychone*, *Cephalangraecum*, *Crossangis*, *Geoniella* and *Bathiea*. The number of species presented in the 32 genera totals 361, of which 88 are placed in the genus *Angraecum* itself. Many new combinations are introduced in the nomenclature of species.—*Earl E. Sherff.*

1768. SCHLECHTER, R. Kritische Aufzählung der bisher aus Zentral-Amerika bekanntgewordenen Orchidaceen. [Critical enumeration of the known orchids of Central America.] Beih. Bot. Centralbl. 36^H: 321-520. 1918.—One hundred pages (p. 421-520) are occupied with

a taxonomic arrangement of the known genera and species of orchids from Central America (including Mexico). The 132 genera are arranged in 36 groups, beginning with the *Cypripediinae* and ending with the *Sarcanthinae*. An extensive synonymy is given throughout. A list of 11 names for Mexican species all described originally by La Llave and Lexarza (Nov. Veg. 2. 1825) is appended; the application of these names to their respective species has not been settled. Preceding the taxonomic arrangement is a detailed historical résumé of earlier collecting of orchids in Central America and Mexico, from the Spanish physician F. Hernandez (Mexico, 1571-1577) down to A. Tonduz, Wrecklé, Biolley, H. Pittier, W. R. Maxon, C. A. Purpus, Mrs. Rousseau, etc. of the present century. The geographic area embraced in the study extends, approximately, from 33° to 9° north latitude and from 80° to 115° west longitude. Separate discussions are given for Mexico, British Honduras, Guatemala, etc. The Mexican flora is referred to four main regions—the warm, the temperate, the arid-temperate (die Kakteenreichen, temperierten Regionen) and the cold. The arid-temperate region has very few orchids. Mexico has a total of 92 genera of orchids. Tables are given showing the relative degree of endemism in each genus. An astonishingly large number of the species, namely 482, or almost four-fifths of the total, are endemic in Mexico. Furthermore, 66 of the remaining species are restricted to Central America, never having been found elsewhere. Only 3 genera (*Erycina*, with 3 species, and *Papperitzia* and *Mormolyce*, each with 1 species) are endemic in Mexico. Mexico and South America have 41 species common to both. Of the orchid flora of British Honduras, Honduras and San Salvador, very little is known. In Guatemala, 84 genera are present. Of these species, 207 are endemic in Guatemala and 92 others are endemic in Central America. Nicaragua's orchid flora is not well known. It has, however, 32 genera: 20 species are endemic in Nicaragua, and 18 others endemic in Central America. Costa Rica is rich in orchids, having 91 genera; 285 species are endemic in Costa Rica and 62 others endemic in Central America. Panama has 54 genera, with 65 species endemic in Panama and 34 others endemic in Central America. Only 5 Panama species are identical with those from the West Indies, but there are 17 Panama species, or about one-seventh of the total, that are identical with South American species.—A table is given showing the species-distribution for each genus in each country studied. Of the 1325 species embraced in the 132 genera, 628 are found in Mexico, 8 in British Honduras, 338 (366 ? —loc. cit., p. 343) in Guatemala, 18 in Honduras, 13 in San Salvador, 57 in Nicaragua, 396 in Costa Rica, 117 in Panama. Relationships of the Central American and Mexican orchids to those of other lands are discussed. A new genus, *Epilyna*, is described. There are also detailed Latin descriptions of 83 new species. These all are included in the taxonomic synopsis that closes the article.—*Earl E. Sherff.*

1769. SCHNEIDER, CAMILLO. Notes on American willows. V. The species of the *Pleonandrae* group. Jour. Arnold Arboretum 1: 1-32. July, 1919.—The present article deals with the American species of *Salix* belonging to the *Pleonandrae* group which comprises the sections *Nigrae*, *Triandrae*, *Pentandrae* and *Bonplandianae*. Twelve species and several varieties are enumerated and their distribution, relationship and nomenclature discussed at length. One species and one form are described as new: *Salix Harbisonii* (*S. marginata* Small, not Wimmer) and *S. amygdaloides* f. *pilosiuscula*.—*Alfred Rehder.*

1770. SCHNEIDER, CAMILLO. Notes on American willows. VI. Jour. Arnold Arboretum 1: 67-97. 1919.—The present article deals with the section *Phylicifoliae* including 10 species, the section *Sitchenses* with 2 and the new section *Browerianae* also with 2 species. The following new species, new varieties and forms are proposed: *Salix pulchra* var. *yukonensis*, *S. planifolia* var. *monica* (*S. monica* Bebb), *S. pellita* f. *psila*, *S. Jepsonii*, *S. Coulteri* f. *parvifolia* and *S. delnortensis*. [See also Bot. Absts. 3, Entries 1838, 1839].—*Alfred Rehder.*

1771. SCHONLAND, S. *Klingia*, a new genus of *Amaryllidaceae*. Rec. Albany Mus. [Grahamstown, South Africa] 3: 178-181. Fig. 1-2. 1919.—This is a description of a new genus from Namaqualand. It is closely allied to *Gethullis*.—*E. P. Phillips.*

1772. ST. JOHN, HAROLD. *Phanerotaenia*, a new genus of Umbelliferae. *Rhodora* 21: 181-183. 1919.—In a study of the genus *Polytaenia* the writer found such fundamental differences in the structure of the fruits of *P. Nuttallii* DC. and its variety *texana* C. & R. as to warrant their separation into two distinct genera. He, therefore, proposes the new generic name *Phanerotaenia* for the variety which now becomes *Phanerotaenia texana* (C. & R.) n. comb. The differences between this plant and the genera with which it might be confused are given, also the description and the geographical distribution in United States.—James P. Poole.

1773. STANDLEY, PAUL O. A neglected *Solidago* name. *Rhodora* 21: 69-70. 1919.—Author takes up *Solidago suaveolens* Schoepf, for *S. odora* Ait. Citation of the literature giving the earlier name.—James P. Poole.

1774. TAYLOR, NORMAN. Britton and Rose's Cactaceae. [Rev. of: BRITTON, N. L., AND J. N. ROSE. The Cactaceae. Descriptions and illustrations of plants of the Cactus family. Vol. 1. pp. 1-236. Plates 1-36, fig. 1-303. Carnegie Inst. Washington, Publ. No. 248. June 21, 1919.] *Torreya* 19: 200-203. 1919.—This book is the most thorough treatment of the systematic botany of the cactus family that has yet appeared. The first volume discusses *Opuntia* and its segregates, and *Pereskia*. *Opuntia* proper contains 254 species, as contrasted with 162 in Schumann's Gesamtbeschreibung der Kakteen (1903). The volume embodies the results of recent exploration by the authors and many others in the Western Hemisphere. In addition to the descriptions and notes on distribution and relationship, complete synonymy is given, together with a wealth of illustrative photographs and drawings. Many prevalent errors as to distribution and specific limits are corrected. Three great cactus-regions are distinguished: (1) Southwestern United States and adjacent Mexico; (2) Mexico and Central America; (3) Argentine, including Paraguay, Uruguay and Chile. Only 56 species of *Opuntia*, mostly endemic, are found in the intervening regions. The work is incomparably the best on the subject that has yet appeared.—J. C. Nelson.

1775. URBAN, I. *Sertum antillanum* V, VI. [An account of Antillean plants.] *Rep. Sp.* Nov. 15: 156-171, 305-323. 1918.—In continuation of his studies on the West Indian flora the author has published the following new species and combinations of flowering plants: *Stelis Desportesii*, *Piper Oviedoi*, *Ficus Plumerii* (*F. citrifolia* Lam., not Mill.), *Gyrotaenia crassifolia* (*Urera crassifolia* Wedd.), *Urera domingensis*, *U. ovatifolia*, *Pilea cyclophora*, *P. parietaria* (L.) Bl. var. *hispaniolensis*, *P. Minguetii*, *P. caulescens* (*Dorstenia caulescens* L.), *P. Tippenhaueri*, *Phenax urticifolius* (*Procris urticaefolia* Poir.), *Leptogonum Buchii*, *Alternanthera peploides* (*Illecebrum peploides* H. & B.), *Pisonia brevipetiolata* (*P. discolor* Spreng. var. *brevipetiolata* Heimerl.), *Clematis barahonensis*, *Nectandra oligoneura*, *Bombax Tus-sacii*, *Eleutherine bulbosa* (*Sisyrinchium bulbosum* Mill.), *Spiranthes quinquelobata* (*Ophrys quinquelobata* Poir.), *Tetramicra canaliculata* (*Limodorum canaliculatum* Aubl.), *Oncidium maculatum* (*Epidendrum maculatum* Aubl.), *Dendrophylax varius* (*Orchis varia* J. F. Gmel), *Talauma dodecapetala* (*Anona dodecapetala* Lam.), *Inga edulis* Mart. var. *grenadensis*, *Mimosa tobagensis*, *Cassia Gundlachii*, *C. arduinervis*, *C. pinetorum* (*Chamaecrista pinetorum* Britton), *C. pinetorum* var. *Picardae*, *C. selleana*, *C. exunguis*, *C. brachycarpa*, *C. martini-censis*, *Caesalpinia Rosei*, *Dalbergia Berterii* (*Ecastaphyllum Berterii* DC.), *Machaerium tobagense*, *Canavalia Ekmani*, *Rhynchosia pyramidalis* (*Dolichos pyramidalis* Lam.), *R. Swartzii* (*Dolichos Swartzii* Vail), *Hyptis americana* (*Nepeta americana* Aubl.), *Blechnum pyramidatum* (*Barleria pyramidata* Lam.), and *Ceratosanthes palmata* (*Trichosanthes palmata* L.).—J. M. Greenman.

1776. URBAN, I. Über zwei Euphorbiaceen-Gattungen. [On two Euphorbiaceous genera.] *Ber. Deut. Bot. Ges.* 36: 501-507. Pl. 16. 1919.—*Cubincola* is described and illustrated as a new genus of the Euphorbiaceae and is based on specimens collected in Cuba by Charles Wright in 1861. The author also presents a brief discussion of the genus *Leucocroton* Griseb.—J. M. Greenman.

1777. WEATHERBY, C. A. Long pond. *Rhodora* 21: 73-76. 1919.—See Bot. Absts. 4, Entry 370.

1778. WEINGART, WILHELM. *Rhipsalis Purpusii* spec. nov. Monatschr. für Kakteenkunde 28: 78-82. 1918.—*Rhipsalis Purpusii* is described and illustrated as new to science. The species was discovered in the state of Chiapas, Mexico, by C. A. Purpus to whom it is dedicated.—J. M. Greenman.

1779. WOODWARD, R. W. Two *Festuca* varieties. *Rhodora* 21: 72. 1919.—Note in regard to two varieties of *Festuca*, *F. ovina* var. *hispidula* and *F. rubra* var. *subvillosa*, and their occurrence in Franklin, Connecticut.—James P. Poole.

1780. YOUNGKEN, HEBER WILKINSON. The comparative morphology, taxonomy and distribution of the Myricaceae of the eastern United States. Contrib. Univ. Pennsylvania Bot. Lab. 4: 339-400. Pl. 81-90. 1919.—See Bot. Absts. 3, Entry 2458.

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

BURTON E. LIVINGSTON, *Editor*

1781. ALEXANDER, W. P. The tamarack, American larch. Nat. Study Rev. 15: 15-17. 1919.

1782. ANONYMOUS. New Jersey peat industry in 1918. Jour. Amer. Peat Soc. 13: 81. 1920.—New Jersey stands first in the United States in peat production. The value of New Jersey peat was \$264,822 in 1918.—G. B. Rigg.

1783. ANONYMOUS. [Rev. of: MISS M. RATHBONE's paper before the Linnaean Society, on "Preserving specimens in formalin."], Jour. Botany 57: 135. 1919.

1784. ANONYMOUS. The Iceland poppy. Gard. Chron. Amer. 23: 162. Fig. 1. 1919.

1785. ANONYMOUS. Plants of the Bible and Biblical lands. South African Gard. and Country Life 9: 206. 1919.

1786. ANONYMOUS. Plants of the Bible and Biblical Lands. South African Gard. and Country Life 9: 303-304. 2 fig. 1919.

1787. ANONYMOUS. Memorial fruit trees for France. Brooklyn Bot. Gard. Rec. 8: 150. Oct., 1919.—New York [City] Bird and Tree Club, coöperating directly with the French government, has inaugurated a campaign for funds to replant destroyed orchards in the devastated regions of France.—C. S. Gager.

1788. ANONYMOUS. Peat as an ingredient of feeds. Jour. Amer. Peat Soc. 12: 183-184. 1919.—Peat has been used as an ingredient of stock feeds at the Texas Agric. Exp. Sta. If used in small amounts this ingredient is beneficial in about the same way that charcoal is. It has also been used in England.—G. B. Rigg.

1789. ANONYMOUS. Peat fuel industry in Europe. Jour. Amer. Peat Soc. 12: 211. 1919.—The use of peat as a substitute for coal has recently been greatly extended in Austria, Switzerland and Denmark.—G. B. Rigg.

1790. ANONYMOUS. Peat fiber in Germany during the war. Jour. Amer. Peat Soc. 12: 214-215. 1919.—A mixture of 50 per cent peat fiber and 50 per cent wool makes a strong durable material that looks well and is suitable for men's clothing. The cost of producing the fiber is high.—G. B. Rigg.

1791. ANONYMOUS. Peat as fuel on Swedish railways. Jour. Amer. Peat Soc. 12: 210.
 1919.—Powdered peat is being used as fuel on some locomotives on Swedish railways. As fired it gives 7780 British thermal units per ton. Its use will not be economical when coal is less than \$11 per ton.—*G. B. Rigg.*

1792. ANONYMOUS. California delta farms. Jour. Amer. Peat Soc. 12: 991-201. 1919.—Several thousand acres of tule-covered peat lands near Stockton, California, are being brought into cultivation.—*G. B. Rigg.*

1793. ANONYMOUS. U. S. peat industry in 1918. Jour. Amer. Peat Soc. 12: 185-187.
 1919.—Over \$1,000,000 worth of peat and peat products were produced in the U. S. in 1918. The chief uses of peat in this country at present are (1) fuel for the production of heat and power, (2) fertilizer, (3) stable litter, (4) stock feed, (5) packing, (6) surgical dressings, (7) agricultural utilization of peat lands. The production of peat fuel in the New England states is increasing rapidly.—*G. B. Rigg.*

1794. ANONYMOUS. Lithuania peat deposits. Jour. Amer. Peat Soc. 12: 220. 1919.

1795. ANONYMOUS. Rattan—its source and its services. Sci. Amer. 121: 7. 1919.

1796. ANONYMOUS. Lily leaves as rafts. Sci. Amer. 121: 61. 1919.

1797. ANONYMOUS. Fuller's earth. Sci. Amer. 121: 149. 1919.

1798. ANONYMOUS. The possibilities of peat. Sci. Amer. 121: 80. 1919.

1799. ANONYMOUS. Novel leaf prints. Sci. Amer. Supplem. 88: 89. 1919.

1800. ANONYMOUS. Flowers and tiny animals in glass. Sci. Amer. Supplem. 87: 296-297.
 6 fig. 1919.—A brief account of glass-blowing of models at the American Museum of Natural History.—*Chas. H. Otis.*

1801. ANONYMOUS. Insulators from kelp. Sci. Amer. 121: 335. 1919.—*Macrocystis* can be made to yield a moist precipitate which can be pressed into any required shape and hardened by treatment with formalin, when it turns perfectly in the lathe and takes a high polish.—*Chas. H. Otis.*

1802. ANONYMOUS. Wood alcohol—a new industrial monarch. Sci. Amer. 121: 462.
 3 fig. 1919.—Possible sources of industrial alcohol mentioned are wood, molasses, the Nipa palm (in the Far East, India, Africa, etc.), the agave (Mexico), gum turpentine and various fruits and vegetables.—*Chas. H. Otis.*

1803. ANONYMOUS. The century plant in Mexico. Sci. Amer. Supplem. 87: 313. 2 fig.
 1919.—The sap of the agave is the source of the national Mexican intoxicants, pulque and mescal; an extract of the leaves is employed as a substitute for soap, and they also yield a fiber which is second to only sisal and hemp in rope making.—*Chas. H. Otis.*

1804. ANONYMOUS. Vegetarian beef extract. Sci. Amer. 121: 191. 1919.—Yeasts, which are a by-product in the manufacture of ethyl or grain alcohol, may be made to yield a cattle food, are valuable as fertilizers and have infinite possibilities as human food.—*Chas. H. Otis.*

1805. ANONYMOUS. [Rev. of RHODES, L. B. A new seed oil from cockle burr. Amer. Chem. Soc. News Service Bull. 231. 1919.] Jour. Franklin Inst. 187: 744. 1919.

1806. BEHRE, A. Nach welcher Richtung ist eine Ergänzung oder Abänderung der Richtlinien B der Bekanntmachung vom 8. April 1918, betr. Grundsätze für die Erteilung oder Versagung der Genehmigung von Ersatzlebensmitteln wünschenswert? [Approval of food substitutes.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel. 37: 238-255. 1919.

1807. BEYTHIEN, A. Ist die Ausdehnung der Ersatzmittelüberwachung auf Wasch-, Bleich-, Scheuer- und sonstige Reinigungsmittel sowie auf Ersatzmittel für Wäsche-Stärke erforderlich? [Regulation of substitute bleaching and scouring materials and washing starch.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 37: 344-370. 1919.

1808. BRITTON, N. L. Report of the Secretary and Director-in-Chief [New York Bot. Gard.] for the year 1918. Bull. New York Bot. Gard. 10: 1-87. 1919.

1809. BURKILL, I. H. Twin nutmeg seeds. Gardens' Bull. Straits Settlements 2: 158. 1919.

1810. BURT, ADENA K. The balsam fir. Nat. Study Rev. 15: 27-31. 1919.

1811. CORREA, M. PIO. Fibras Texteis e Cellulose. [Textile fibers and cellulose.] 276 p., 70 fig., 7 diagrams. Rio de Janeiro, 1919.—After a general introduction regarding the fiber plants of Brazil, including those for which the conditions in Brazil are regarded as favorable, and especially plants which may yield fiber suitable for paper stock, detailed information, including botanical and common names and synonyms, is given regarding the following species:—*pitheia gigante*, *Furcraea gigantea*; juta, *Corchorus capsularis* and *C. olitorius*; gravatá de rede, *Ananas bracteatus*; gravatá de gancho, *Bromelia karatas*; canhamo, *Cannabis sativa*; guaxima roxa, *Urena lobata*; guaxima do mangue, *Hibiscus tiliaceus*; papoula do Francisco, *Hibiscus cannabinus*, and notes relating to less important species. It is the most comprehensive work that has been published thus far regarding the fiber-producing plants of any portion of South America.—L. H. Dewey.

1812. FLETCHER, G. The industrial peat problem in Ireland. Jour. Amer. Peat Soc. 12: 205-208. 1919.—In Ireland, since coal is expensive, producer gas can be made from peat more cheaply than from coal. Nitrogen is recovered in the form of ammonium sulphate as a by-product.—G. B. Rigg.

1813. FULTZ, F. M. Flower camouflage. Peculiarities of some wild flowers of southern California. Sci. Amer. Supplem. 88: 8-9. 5 fig. 1919.

1814. GARDNER, H. A. Legitimization of soya bean oil. Sci. Amer. 121: 193. 1919.—Concerns the use of soya bean oil in paints and varnishes.—Chas. H. Otis.

1815. GRANDCOURT, GENEVIEVE. Eternal youth as a scientific theory. Sci. Amer. 121: 482, 490, 500. 1919.—A discussion of the place which VORONOFF's thesis occupies in the general field of human interest.—Chas. H. Otis.

1816. HERITAGE, J. P. Is alcohol dead? Sci. Amer. Supplem. 88: 242-243, 256. 1919.—An article treating, among other considerations, of the various plant sources of alcohol and the cost of manufacture from the different sources.—Chas. H. Otis.

1817. HINDSHAW, H. H. Logical methods of utilization of Minnesota peat. Jour. Amer. Peat Soc. 13: 37-44. 1920.—Modern methods of handling and treating increase the value of peat for various forms of fuel.—G. B. Rigg.

1818. HITCHENS, ALFRED B. Modern applications of photography. Jour. Franklin Inst. 187: 129-146. Fig. 1-13. 1919.—A peculiar résumé of the subject including descriptions of several biologic applications.—Ernest Shaw Reynolds.

1819. HOWE, H. E. Tobacco stems. Sci. Amer. 121: 162, 163. 1919.

1820. JUCKENACK, A. Kennzeichnung der früher als alkoholfreier Punsch, Grog, Likör u. dergl. in dem Verkehr gelangten Getränke. [Alcohol-free punch, etc.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 37: 220-238. 1919.

1821. LEADBEATER, J. W. Decolorizing carbon. Jour. Amer. Peat. Soc. 12: 222. 1919.—British patent 122698 (Jan. 31, 1918) covers a method of preparing decolorized carbon from peat.—G. B. Rigg.

1822. MACMURRAY, NELL. Elder blossoms. Amer. Bot. 25: 66. 1919.

1823. MARIE-VICTORIN, FR. DES E. C. Toxicité de la prêle des champs. [Toxicity of field horsetail (*Equisetum arvense* L.).] Naturaliste Canadien 46: 148-151. Jan., 1920.—The author presents evidence to show that *Equisetum arvense* L., together with *E. sylvaticum* L., *E. fluviatile* L. and *E. hyemale* L., have proved poisonous to horses, especially on the low clay banks of the St. Lawrence river. About May, 1919, five horses showed symptoms of cerebro-spinal meningitis apparently due to horse-tail poisoning. He gives descriptions of symptoms by FRIEDBERGER AND FROHNER, and by PROF. JONES AND DR. RICH. Young horses succumb more readily than old ones and those fed on grain show greater resistance than others. The old, dry plants eaten with hay are especially toxic. The symptoms are described as *equisetosis*. [See also Bot. Absts. 4, Entry 1840.]—A. H. MacKay.

1824. MATTLE, P. A. The Swiss mountain pine. Nat. Study Rev. 15: 1-5. 1919.—Description of scenery.

1825. NAGEOTTE, J. Organic matter and life. Sci. Amer. Supplem. 87: 362-363. 1919. [Translated for the *Scientific American Supplement*; source not stated.]

1826. OTT, E. Gas from peat. Jour. Amer. Peat Soc. 12: 210-211. 1919.—Owing to their comparatively high oxygen content and low carbon content, wood and peat, when subjected to destructive distillation, yield a gas containing a high proportion of carbon dioxide and consequently a low calorific value. The tars yielded by these substances are hygroscopic.—G. B. Rigg.

1827. PAMMEL, L. H. The whorled milkweed. Amer. Jour. Vet. Med. 14: 135-136. 1919.—Two letters are quoted giving details of a case of sheep poisoning in Colorado by the whorled milkweed, identified by the author as *Asclepias verticillata*. The letters state that potassium permanganate, given hypodermically, was used as a remedy. The remainder of the article is material from Colorado Agric. Exp. Station Bull. 246. [See also next following Entry, 1828.]—C. D. Marsh.

1828. PAMMEL, L. H. Whorled milkweed. Amer. Jour. Vet. Med. 14: 514. 1919.—After a note on the newspaper reports of whorled milkweed as a poison to stock in Colorado, a list is given of Iowa localities for *Asclepias verticillata*. The plant is found at Minneapolis and St. Paul, LaCrosse (Wisconsin), and Yankton (South Dakota), as well as in Colorado. [See also next preceding Entry, 1827.]—C. D. Marsh.

1829. PAMMEL, L. H. Frozen beet tops. Amer. Jour. Vet. Med. 14: 244. 1919.—Three horses died, presumably from eating frozen sugar-beet tops. A short description of the symptoms is given.—C. D. Marsh.

1830. PAMMEL, L. H. Supposed poisoning from cowbane. Amer. Jour. Vet. Med. 14: 456. 1919.—A weed sent from Colorado is identified as either *Cicuta maculata* or *C. occidentalis*. The author states that he has fed *Cicuta* roots to horses in summer without injury, but that these roots produce fatalities in the fall or winter. It is supposed that injurious results from feeding this plant are caused by the fresh leaves. Many persons have been poisoned by contact with the plant when perspiring. [See also Bot. Absts. 4, Entry 1834.]—C. D. Marsh.

1831. PAMMEL, L. H. Fly amanita and boleti. Amer. Jour. Vet. Med. 14: 514. 1919.—Large numbers of specimens of *Boletus* were seen at an altitude of 11,000 ft. in Colorado. In the same region the fly amanita was numerous and it is suggested that the latter may cause some poisoning of sheep in that region. A description of the fly amanita (*A. muscaria*) follows.—C. D. Marsh.

1832. PAMMEL, L. H. **Poison hemlock.** Amer. Jour. Vet. Med. 14: 513. 1919.—The occurrence of poison hemlock, *Conium maculatum*, is noted for Bellevue (Iowa), Golden (Colorado), and the neighborhood of Salt Lake City. A description of the plant and the symptoms it produces is given.—C. D. Marsh.
1833. PAMMEL, L. H. **Suspected poisonous plant from Arkansas.** Amer. Jour. Vet. Med. 14: 417-418. 1919.—A plant of *Ranunculus abortivus* was sent by a correspondent who thought it might have been the cause of death in cattle. The reply suggests that, while this and other buttercups are acrid, there is no evidence that they poison cattle.—C. D. Marsh.
1834. PAMMEL, L. H. **Poisoning from cowbane.** Amer. Jour. Vet. Med. 14: 419. 1919.—The weed (*Cicuta*) does not produce injury when dried and cured. Warning is given to use gloves when pulling it, as cases of fatal poisoning of human beings have followed contact with the plant. [See also Bot. Absts. 4, Entry 1830].—C. D. Marsh.
1835. PAMMEL, L. H. **Poisoning from sorghum and Sudan grass.** Amer. Jour. Vet. Med. 14: 30-31. 1919.—A brief discussion of the subject with accounts of cases.—C. D. Marsh.
1836. PAMMEL, L. H. **Sorghum blight.** Amer. Jour. Vet. Med. 14: 189. 1919.—In answer to a query as to whether the red streaks on sorghum cane are connected with its poisonous properties, answer is made that the streaks are due to *Bacillus sorghi* and have nothing to do with the toxicity of the sorghum.—C. D. Marsh.
1837. PAMMEL, L. H. **White snakeroot poisonous in Illinois.** Amer. Jour. Vet. Med. 14: 31. 1919.—Describes the symptoms exhibited by calves poisoned by *Eupatorium urticaefolium* and gives details of the treatment used. The symptoms were considered as diagnostic of trembles or milksickness.—C. D. Marsh.
1838. PAMMEL, L. H. **Pingue poisoning in Arizona.** Amer. Jour. Vet. Med. 14: 32. 1919.—Reports information from Williams, Arizona, of the poisoning of sheep in that neighborhood, and adds some information from other sources. Pingue is the Mexican name for *Hymenoxys floribunda*.—C. D. Marsh.
1839. PAMMEL, L. H. **Deadly nightshade and bitter-sweet.** Amer. Jour. Vet. Med. 14: 192. 1919.—Reports a case of poisoning of a sheep by *Solanum nigrum* and states that the leaves are toxic to animals. The fruit is used for making jams and has little toxicity.—C. D. Marsh.
1840. PAMMEL, L. H. **Poisoning from horsetail.** Amer. Jour. Vet. Med. 14: 245-246. 1919.—Replying to a correspondent who suggest that cerebrospinal meningitis may be produced in horses by *Equisetum arvense*, it is stated that the weed does produce a form of paralysis, but not cerebrospinal meningitis. Statements from PAMMEL's Manual of poisonous plants are given. [See also Bot. Absts. 4, Entry 1823].—C. D. Marsh.
1841. PAMMEL, L. H. **Sesban or mole-bean poisonous.** Amer. Jour. Vet. Med. 14: 246. 1919.—A correspondent reported that the mole-bean (*Sesbania platycarpa*) is said to poison cattle in North Carolina. The author says that it belongs to a family containing many poisonous plants, and has previously been suspected of being poisonous.—C. D. Marsh.
1842. PAMMEL, L. H. **Mechanical irritation of some plants.** Amer. Jour. Vet. Med. 14: 307-308. 1919.—*Mucuna pruriens*, *Hordeum jubatum*, *Stipa spartea*, *Stipa comata* and species of *Opuntia*, are mentioned as plants producing mechanical irritation in stock. BROWN AND ANDERSON are quoted regarding calcium oxalate crystals in *Arisaema triphyllum* and *Calocasia*, and the acrid principle in *Phytolacca*.—C. D. Marsh.
1843. PAMMEL, L. H. **A little history on ergotism.** Amer. Jour. Vet. Med. 14: 357-358. 1919.—The author had supposed that the outbreak of ergotism in Kansas in 1884 was first correctly diagnosed by DR. STALKER. DR. FAVILLE claims, in a letter, to be the first to make the correct diagnosis.—C. D. Marsh.

1844. PAMMEL, L. H. Cocklebur injurious. *Amer. Jour. Vet. Med.* 14: 358. 1919.—A brief statement is made of the conjectures in regard to poisoning by cocklebur—species of *Xanthium*.—C. D. Marsh.

1845. PAMMEL, L. H. Forage poisoning. *Amer. Jour. Vet. Med.* 14: 360. 1919.—In reply to question as to whether crab-grass smut (*Ustilago rabenhorstiana*) might have been the cause of deaths of cattle, reply is made that the smut is not strongly toxic, and that the deaths were probably produced by sorghum or some other toxic plant.—C. D. Marsh.

1846. PAMMEL, L. H. Loco weed and salt sage. *Amer. Jour. Vet. Med.* 14: 360-361. 1919.—A letter is quoted from DR. BENOY, of Maxwell, New Mexico, in which are described the symptoms produced in horses from eating "salt" or "white" sage—*Eurotia lanata*. Reference is also made to a loco plant, *Astragalus* sp., with a purple bloom.—C. D. Marsh.

1847. SAUVAGEAU, C., AND LOUIS MOREAU. Sur l'alimentation du cheval par les algues marines. [Marine algae as food for horses.] *Compt. Rend. Acad. Sci. Paris* 168: 1257-1261. 1919.—Authors note that various algae have been used for forage at various times, among which were *Laminaria flexicaulis*, *Alaria esculenta*, *Rhodymenia palmata* and *Fucus serratus*. Feeding experiments using *Fucus serratus*, *Laminaria saccharina* and *L. flexicaulis* showed that *F. serratus* and *L. flexicaulis* make excellent forage when animals become accustomed to them, and that they appear also to assist in the assimilation of other foods.—V. H. Young.

1848. SEEL, E., W. DEUZEL, AND E. RAUNECKER. Über Kriegsbiere. [War beer.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 37: 116-124. 1919.

1849. SMITH, E. A. Illustrating biological manuscripts. *Trans. Amer. Microsc. Soc.* 38: 1-19. Pl. 1-5, fig. 1-7. 1919.—Books on drawings are usually written for artists and journeymen, and the beginner has difficulty in finding in them the information he desires. An attempt is made in this article to give clearly such information as the beginner in science needs for making drawings, of the media used for certain classes of work, how drawings are made, and the limitations of reproduction methods. Black pictures on white backgrounds make the best reproductions. Authors are advised to study illustrations in journals and to select the styles of drawings which will best illustrate their subjects. Three methods of illustration are discussed: Intaglio; Planographic, which includes lithography, photolithography, and the photogelatin or heliotype method; and Relief, which includes the zinc-process and half-tone. Each process is discussed in detail. Under the head "Drawing for publication," the following topics are discussed: outline; shading; drawing in ink, wash, crayon and pencil; fixing pencil and crayon drawings; combinations; methods for special subjects; colored drawings and their reproduction; graphs; photographs; reduction and arrangement of drawings for reproduction. The article is fully illustrated with text figures and plates, and a table of methods and processes more commonly used for special subjects and one of standard magnifications are given.—S. H. Essary.

1850. SOTH, MRS. BLANCHE H. The Arctic gentian. *Amer. Bot.* 25: 41. Pl. 1. 1919.

1851. THATCHER, R. W. Coöperation in peat investigations. *Jour. Amer. Peat Soc.* 13: 10-12. 1920.

1852. VON BLON, J. L. Binder twine from the desert. How a use has been found for an utterly useless plant. *Sci. Amer.* 121: 82-83, 97. 7 fig. 1919.—Descriptive of the yucca or "Spanish bayonet."—Chas. H. Otis.

1853. WHETZEL, H. H. Democratic coördination of scientific effort. *Science* 50: 51-55. July, 1919.—In this paper, delivered before the joint session of the Botanical Society of America and the American Phytopathological Society of America, at Baltimore, Dec., 1918, the author makes a strong appeal for coöperation and coördination among scientific men. Progress recently made among plant pathologists is used as illustration of what can be accomplished in other fields of science.—A. H. Chivers.

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